Volume 73 No 7
July 2005

Amateur Radio

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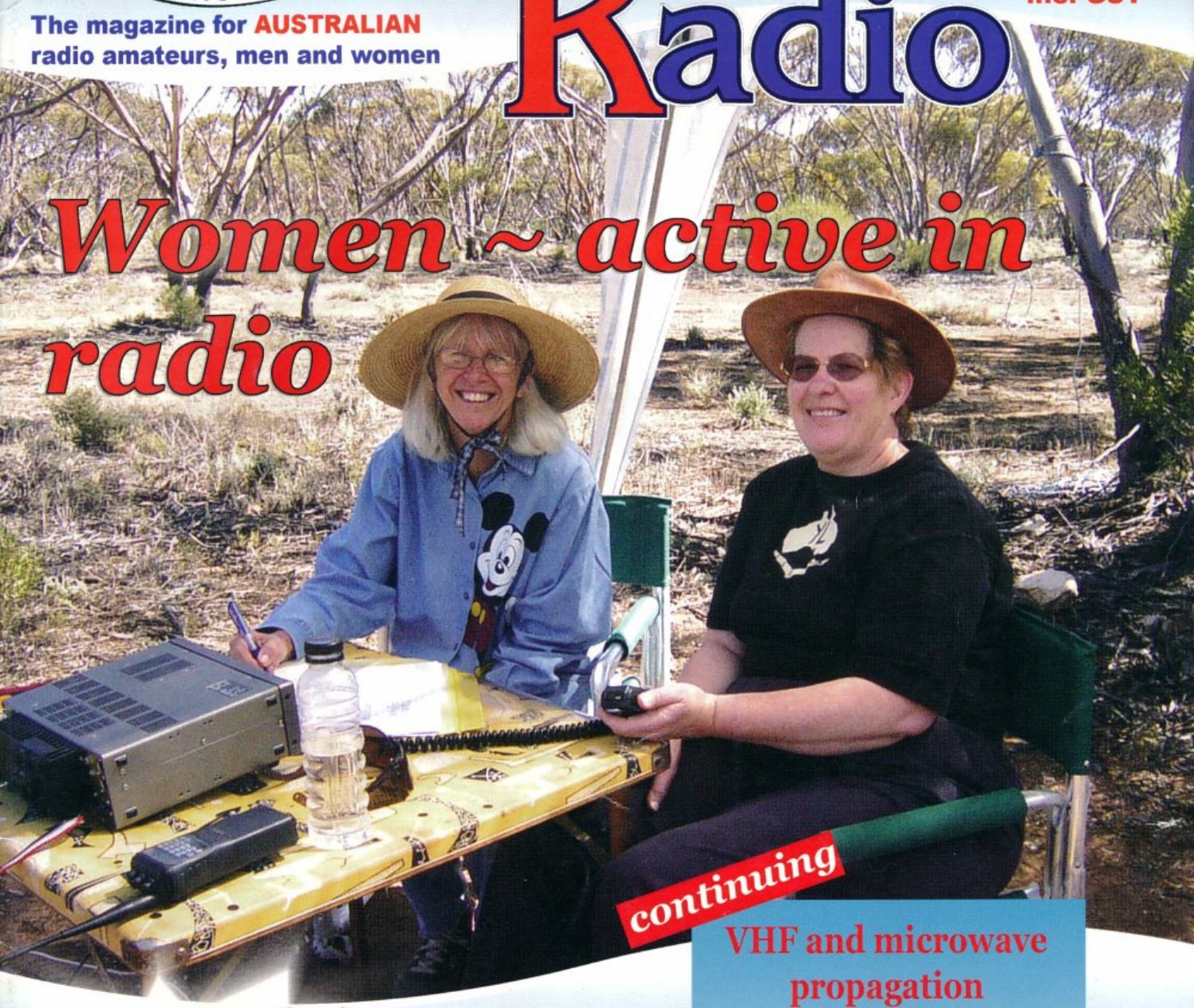
The magazine for AUSTRALIAN
radio amateurs, men and women

Women ~ active in radio



continuing

VHF and microwave propagation characteristics of ducts

Andrew L Martin, VK3KAQ

Unravelling the mysteries of connecting radios to antennas

Brian Clarke, VK2GCE

A miniature variable DC supply

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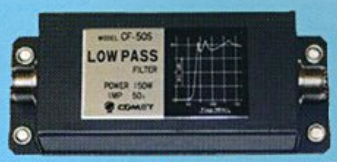

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Amateur Radio

Volume 73, Number 7
July 2005

The Journal of the Wireless Institute of Australia
ISSN 0002-6859

Editorial

Editor: Colwyn Low VK5UE
edarmag@chariot.net.au

Technical Editor: Peter Gibson VK3AZL

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Submission of material to Amateur Radio Magazine

General and Technical articles to
Secretary
AR Publications Committee
3 Tamar Court
Mentone VIC 3194
or armag@optusnet.com.au

Columns and Letters to the Editor to
Editor
AR Magazine
34 Hawker Crescent
Elizabeth East SA 5112
or
edarmag@chariot.net.au
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Registered Office
10/229 Balaclava Road,
Caulfield North VIC 3161
Australia
Phone: 03 9528 5962
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Production Deadlines

Advertising booking and articles for publication 10th of preceding month.

Hamads and advertising material deadline 18th day of preceding month

GENERAL

TECHNICAL

COLUMNS

Our Cover this month

Front cover shows Tina VK5TMC and Lesley VK5HLS operating the Adelaide Hills Amateur Radio Society Johm Moyle Field Day station in March 2005. The station was set up on the property of Geoff VK5TY and Christine VK5CTY near Swan Reach. See *Women in Radio* article on page 28

Contributions to Amateur Radio
Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, How to write for Amateur Radio is available from the National Office on receipt of a stamped self-addressed envelope.

Back Issues
Back issues are available directly from the WIA National Office (until stocks are exhausted), at $4.00 each (including postage within Australia) to members.

Photostat copies
When back issues are no longer available, photocopies of articles are available to members at $2.50 each (plus an additional $2 for each additional issue in which the article appears).

Disclaimer
The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

The world's first and oldest National Radio Society
Founded 1910

Representing
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Member of the
International Amateur Radio Union

Registered Office of the WIA
10/229 Balaclava Road, Caulfield North Vic 3161
Tel: (03) 9528 5962 Fax (03) 9523 8191
email: nationaloffice@wia.org.au
http://www.wia.org.au

All mail to
PO Box 2175 Caulfield Junction VIC 3161
***Business hours:* 10am – 4pm weekdays**

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Editorial comment

Colwyn Low VK5UE

A helping hand for old-timers

The year is now half over and we have a moment to look back and look forward. There are some things I planned to do and have done and some I still need to do. I also have to ask if they still need done!

I received a letter recently which discussed the plight of amateurs who have to move into retirement complexes or similar and due to the establishments rules are no longer able to erect aerials and operate transmitters. Some may be fortunate enough to be allowed to but are not longer physically able to do the work. It was suggested that radio clubs might consider having Old Timers Nights when these amateurs who could not set up a full station could be brought to the club rooms and operate the club station. The other problem could be solved with a "Help team" who would be able to visit amateurs with problems setting up a station and sort out how a station could be set up for the amateur to continue to enjoy his or her hobby.

Another topic that came up was with the level of detail we include in articles. Now while we do have members with tertiary degrees, and we do have amateurs with technical diplomas and we do have amateurs who are computer whizzes, we also have a lot of amateurs who have no formal training in electronics, radio, physics, mathematics, electrical engineering or computing other than what they learnt to get a licence and in using that licence. So articles in AR are pitched at a general level group who know a bit more than the unrestricted licence requires but are not of a level to be submitted to the Journals of the IEEE. I am sorry if this makes some people think we are only writing for the least able. We are not. We aim to provide material which all can use, learn from or construct. Those who require more have access to libraries and the Internet to learn more.

I also had a letter suggesting that the Aerial Analyser would give incorrect answers if used in a particular way. However the author confirmed this was outside the scope of the instrument which was a low cost aid to set up aerials and as you got closer to the proper 50 Ω match, the answers became more accurate. If you want more you have to pay for it.

The Remembrance Day contest is nearly upon us. This year there has been a revamp of the contest scoring so please read the rules on page 43 carefully. We thank the retiring RD Contest manager Alek Petkovic, VK6APK for the work he has done to keep this contest running and wish Chris Edmondson VK4AA all the best is keeping up the high standards of this, the premier Australian home contest.

We apologies to Rodney Champness whose OTU letter page 44 on the June AR on BPL interference lost his name as the author in the production process.

VK5UE

Are you managing the estate of a 'Silent key'?

Please save any QSLs for the National QSL collection, but first contact:

The Hon. Curator,
Ken Matchett VK3TL
on
(03) 9728 5350
or email
jeandawson@iinet.net.au

Rare DX, special call-signs prefixes and suffixes, pictorials and pre-war QSLs are needed.

Let us save something for the history of amateur radio.

Michael Owen VK3KI

A generous bequest

I never met Henry Gustaf Andersson.

But since his death I have learnt something about him.

Henry Andersson was VK8HA. He was born in Sweden and came to Australia many years ago.

Henry's wife predeceased him some 10 years ago.

Henry built his house at 30 Trippe Road, Humpty Doo in about 1988, on some 5 acres of land. Humpty Doo is on the Arnhem Highway, a few kilometres from the Stuart Highway, in all some 40 minutes or less drive from central Darwin. The township itself has a shopping centre, with even a Woolworth's supermarket.

Henry erected three antenna towers on his land.

There were two other amateurs in the Northern Territory who had come from Scandinavia with a similar background to Henry and who were among his real friends. One was Karl, VK8CAW from Darwin, and the other was Len, VK8DK, from Tennant Creek. I have met them both, and we have talked of Henry.

Henry was an Honorary Life Member of the South Australian and Northern Territory Division, and had immediately become a member of the national WIA when he was invited to do so.

Henry set up and ran the VK8 QSL Bureau for some 38 years.

The late Peter Naish's wonderful description of Henry described his passion for CW operating, mainly on the HF bands of 14/21/28 MHz and that his was always an outstanding signal. His QTH of Humpty Doo, a curious name, became a familiar name to the DX fraternity who never quite knew where it was or what it meant.

Henry became a member of the First Class Operators Club (FOC) in 1970. Membership of FOC is reserved for those who can display exemplary CW operating skills and is by invitation only. At any one time there are only 500 members worldwide.

He was the Federal Intruder Watch Coordinator, and had been appointed National Intruder Watch Coordinator when the new WIA Board met in May 2004, its first meeting after the adoption of the new Constitution, and all the appointments made at the Annual General Meeting that adopted the new Constitution were confirmed.

The purpose of the Intruder Watch program is to discourage and remove stations that are not amateur stations from those parts of the radio spectrum that are allocated exclusively to amateurs. Because, in the end, only a country can stop a station transmitting in its territory without regard to the international table of allocations, it is a slow and often unrewarding task.

It requires skill to identify the intruder and patience to persist when there is not much response to the report, with the knowledge that what you are doing may at least discourage some stations from transmitting on the small and vulnerable amateur HF bands.

As I said recently, when we celebrated the 100th birthday of Alf Chandler, VK3LC, it seems that only special and truly dedicated people take up this task.

He resigned that position in around August 2004, as his health failed and he could no longer perform the function adequately.

He died on 5 October 2004.

On 22 August 2004 Henry signed his will.

It had been written by Henry himself, using a will kit. His will left his "house and lands" to the WIA, and "all personal family effects, Jewellery and Photos", and residuary estate to his only relative in Australia, the widower of his wife's sister.

He appointed the Public Trustee his executor.

So the WIA inherited Henry's land and house, and the WIA Board believed the only option open to it was to sell the property as quickly as it could.

The WIA has been greatly assisted by Karl Warchot, VK8CAW, who assisted the Public Trustee by identifying and selling any of Henry's equipment that was of any value.

A real problem facing the WIA in handling the Estate was that it needed someone in Darwin to help, for example by arranging insurance, arranging cleaning of the premises and the removal of what was not required (including the three towers) and generally to be "on the spot".

Garry Woods, VK8GW, willingly undertook this task.

In the end, the WIA will receive just over $250,000 after meeting expenses when the sale is settled in mid July.

I am greatly moved by the generosity of Henry Andersson. He was a real amateur and a real supporter of amateur radio.

His generous bequest during this period of change, as we work to create a single national body, gives us great hope and great confidence, because it means that we have some reserves that at least give us confidence.

As I say, I never met Henry.

But we must make sure that we do not forget Henry Gustaf Andersson, VK8HA, SK.

ar

Plan ahead

Remembrance Day Contest
13 & 14 August

ALARA Contest
27 & 28 August

WIA news

New WIA membership category Introduced

Following the WIA Board meeting in Sydney on 8 and 9 April 2005, it was announced that a new category of membership, "Family Membership", would be introduced.

A Family Member is a second or further person living at the same address as a Member or Concession Member receiving AR. A Family Member does not receive AR, and membership only costs $40 a year.

The new Family Membership was offered for the first time at the WIA stand at the Oxley Region Amateur Radio Club 30th Anniversary Field Day Weekend at Port Macquarie on 11 and 12 June 2005.

Some 15 new members joined the WIA over the weekend, including 3 Family Members.

Family Membership is a way the whole family can support the WIA.

The new Membership Application Form is now on the WIA web site, with provision for not only Family Membership, but also 5-year membership.

WIA office delays

As a result of the reorganisation of the WIA office, with Judith Oliver taking over from June Fox, the installation of new equipment and software and illness, some delays have continued in a number of functions undertaken by the office.

Every effort possible has been made to keep the exam function up to date.

However, WIA President Michael Owen announced in early June that there would be a couple of weeks delay before the renewal notices for July will be sent out. July renewals account for nearly half the WIA's total membership, and are usually posted in early June.

This year, the renewal notices are in a new form. They will be generated by the new membership management software and offer renewals for 5 years.

However, because of the requirement that the WIA fully test the new system before going "live", the July renewals will not be posted until early July.

So, please don't worry if you haven't received your renewal notice as early as you usually have received it, it will come and AR will also keep coming.

And when you do receive it, please think about renewing your membership for 5 years.

Alf Chandler, VK3LC, 100 years old

On 30 May 2005 the Moorabbin and District Radio Club conducted a special celebration to honour the 100th birthday of Alf Chandler, VK3LC, attended by many of his friends, the Mayor of the City of Kingston, Topsy Petchy, Jim Linton, VK3PC, President of Amateur Radio Victoria and Michael Owen, VK3KI, President of the WIA.

Michael presented Alf with his WIA Honorary Life Member certificate and badge.

Channel 9 covered the event in its news that evening.

The new amateur licence structure

On 4 May 2005 WIA President Michael Owen, VK3KI, announced that the WIA had been advised by the ACA that it was then anticipated that the Outcomes of the Review, originally promised for early 2005, including the new licences, would not be able to be introduced before "the third quarter of 2005".

A few days later, on 7 May, at the Open Forum associated with the WIA Annual General Meeting, the members present unanimously passed a resolution expressing their concern, and requesting the ACA to introduce the new Foundation Licence and the new licence privileges without further delay and in any event not later than 30 June 2005

On 10 May 2005 the President wrote to the Acting Chair of the ACA, conveying these concerns, and suggesting that other changes to the LCD could follow the changes to introduce the new licence structure.

On 26 May 2005 a response was received from Dr Bob Horton, Acting Chairman of the ACA.

After expressing his regret at the delay, Dr Horton wrote:

"In order to expedite the introduction of the core elements of the new licensing arrangements, the ACA has already taken steps to implement the Review Outcomes in two phases. The first phase will involve the minimum change necessary to introduce the Advanced, Standard and Foundation Amateur licences. All other changes including the class licence that will allow overseas visiting Amateurs to operate in Australia without the need to apply for individual licences, will be implemented in the second phase.

I am aware that the WIA continues to contribute significantly towards ensuring the successful introduction of the new licence categories. On behalf of the ACA, I would like to thank the WIA for this contribution.

Although the two phase procedure will enable the ACA to introduce the three new amateur licences in the quickest time practical, it is still not possible for the ACA to guarantee that the changes will be introduced before 30 June 2005."

Good news for US amateurs on BPL interference.

Motorola has announced the development of a new BPL delivery method that it claims greatly reduces the potential interference to amateur radio stations.

The ARRL, which cooperated with Motorola from the start in the development of the system, reports that the semiconductor manufacturer was `all ears' when it came to avoiding interference to radio amateurs.

Named "Powerline LV", the new system is quite different from current North American BPL systems, as it only uses the local low voltage power line from the transformer to the home to deliver the BPL signal, using a "Homeplug" type format. The long haul distribution of the BPL signal which was previously achieved using the medium voltage power lines, is now achieved in the Motorola system by wireless. The long haul medium voltage distribution of BPL was found to be the major radiating component in US trials.

Unfortunately, the Australian and New Zealand power distribution systems are very different from the North American

continued on page 27

Unravelling the mysteries of connecting radios to antennas. *Part 4.*

Brian Clarke, VK2GCE
brianclarke01@optusnet.com.au

Baluns: design and construction

Some balun design considerations.

There are four major concerns in constructing baluns/ununs:

1. output impedance;
2. turns ratio and impedance ratio;
3. construction materials and methods; and
4. power handling capability.

Each of these factors is discussed below.

Output impedance

In some literature, you'll find reference to current baluns/ununs and voltage baluns/ununs. What is really referred to is output impedance. If you use a balun to feed the centre of a balanced half-wave dipole, a low impedance balun would be used and it would be called a current balun. If you use an unun to feed the end of a half-wave antenna, it would be a high impedance device and be called a voltage unun.

Some typical applications, and (approximate) output impedances are:

- Multi-parasitic Yagi-Uda – perhaps as low as 5 Ω
- Simple Yagi-Uda with just three elements – 18 Ω
- Quarter-wave vertical over horizontal ground-plane – 36 Ω. (eg, car roof VHF and UHF whips)
- Quarter-wave ground-plane with radials drooped 135° – 50 Ω
- Horizontal dipole 0.18λ above ground – 50 Ω
- Well-isolated horizontal or vertical resonant dipole – 72 Ω
- Off-Centre-Fed antenna – 150 to 1000 Ω depending on feed-point location
- Five-eighth-wave vertical – 200 Ω
- End-fed Zeppelin – 1000 to perhaps 5000 Ω

The impedances quoted for the first five examples above are at the fundamental resonant frequency – the impedance will be different (usually higher) for other resonant frequencies. A balun/unun works best into constant impedance. And you get the highest energy transfer efficiency when the output impedance of the balun/unun matches the feed impedance of the antenna (Jacobi theorem). If you intend to use just one balun/unun for multi-band operation, design the device for the highest output impedance because then all the other impedance requirements will result in a lower input voltage, which will not stress the magnetic design.

Turns ratio and impedance ratio

We know from Lenz's law that, until we approach saturation in the magnetic circuit, voltage is directly proportional (by the factor 'k') to the number of turns (N). If we denote the primary with subscript 1 and the secondary with subscript 2, we get:

$$R_1 = V_1 / I_1 \ \& \ R_2 = V_2 / I_2 \quad (1)$$

$$V_1 = kN_1 \ \& \ V_2 = kN_2 \quad (2)$$

$$I_1 = k/N_1 \ \& \ I_2 = k/N_2 \quad (3)$$

(Equations 3 follow directly from Ohm's law; ie, current is inversely proportional to voltage in a constant impedance circuit. And factor 'k' is the same in all equations because the magnetic circuit is common to all.)

If we now set equations 1 as a ratio, we get:

$$R_1 / R_2 = V_1 I_2 / V_2 I_1 \quad (4)$$

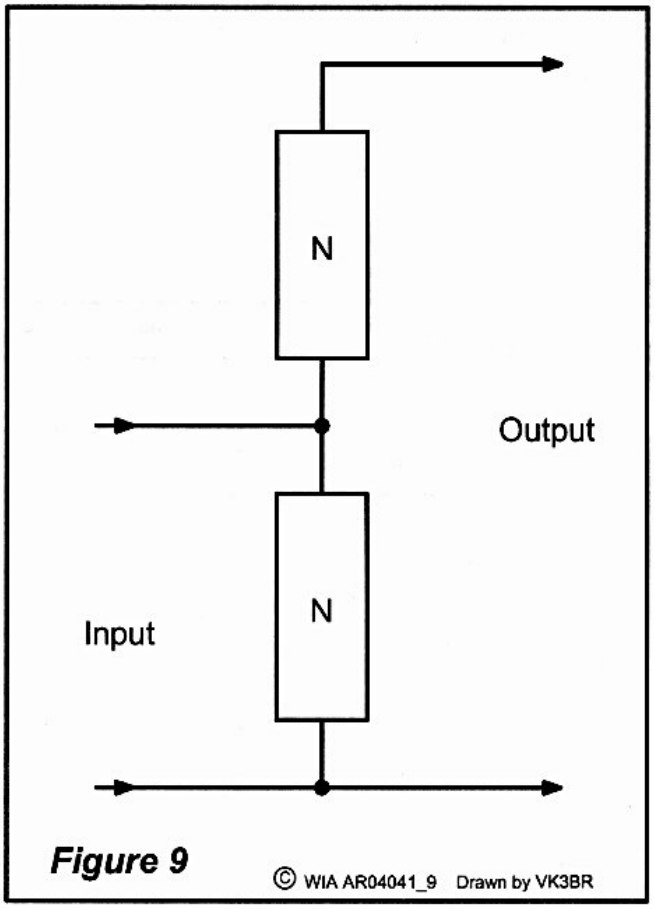

Fig 9. A 4:1 unun auto-transformer.

Substituting both equations 2 and 3 into equation 4, we get:

$R_1 / R_2 = (kN_1k / N_2) / (kN_2k / N_1)$

$= (N_1/N_2)^2$

Or, in words, the primary to secondary impedance ratio is equal to the square of the turns ratio.

In Figure 9 we have an unun with an N-turn primary and a 2N-turn secondary. It is an auto-transformer design because the primary and secondary have one common lead, and neither the input nor the output can be balanced. This design is easily realised by winding two conductors in parallel, also known as bifilar wound. The impedance ratio, primary to secondary, is 1: 4.

How could we make this into a 1:1 unun? It just requires a slight rewiring as shown in Figure 10.

Though the foregoing are both auto-transformer designs (because the primary and secondary have a common connection), an unun doesn't have to be an auto-transformer. For example, consider Figure 11.

If the primary and secondary are wound as two parallel conductors (bifilar wound), this would be a transmission line transformer. If the primary and secondary are both unbalanced, it would be a unun – and if both primary and secondary are balanced, it would be a balbal. You can work out what a balun might be.

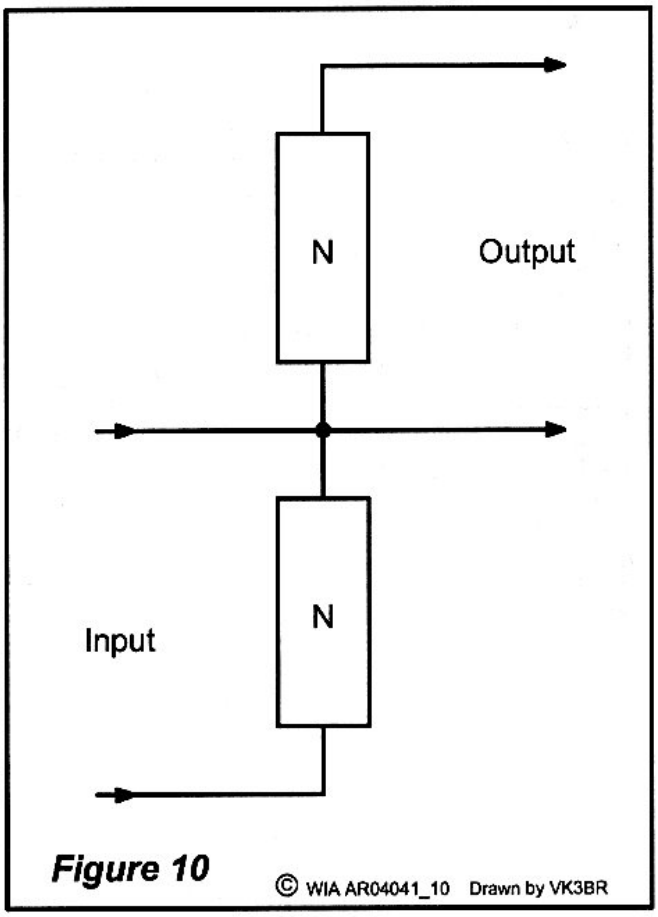

Fig 10. A 1:1 unun auto-transformer.

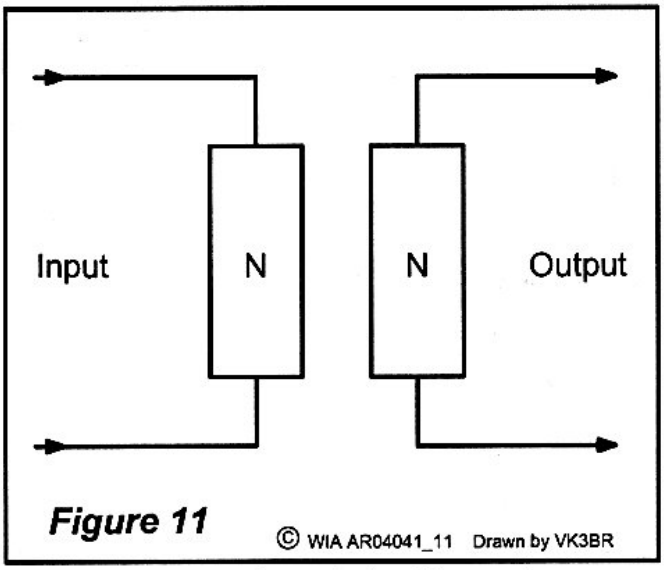

Fig.11. A 1:1 transformer isolated input and output

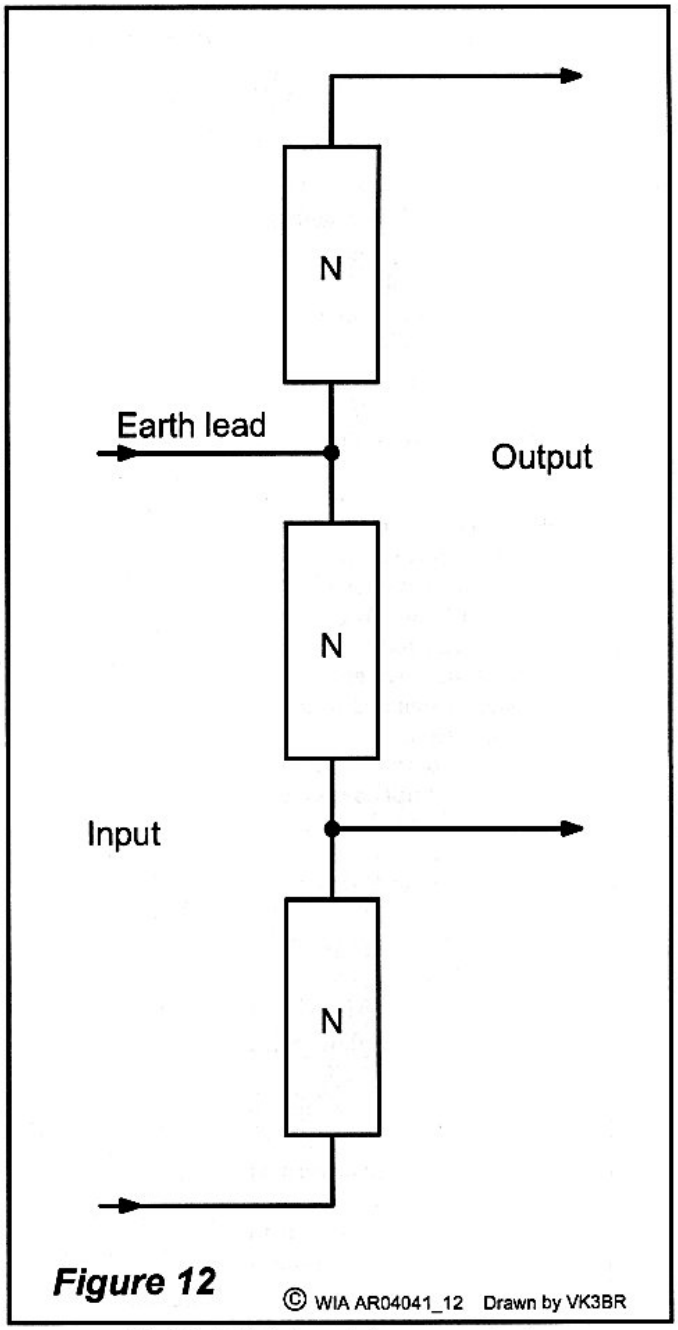

Fig.12. A 1:1 balun with common leads

How about a 1:1 balun with common leads? See Figure 12.

This is realised as a trifilar wound auto-transformer, but now the output is balanced with respect to the upper input lead (labelled Earth). However, it is not an isolated design, because of the common connections. So 'balanced' does not imply isolation of output from input.

Other impedance ratios can be realised by going to quadrifilar winding or even higher. Alternately, as with mains transformers, we could wind different numbers of turns on our primary and secondary. But if we do this, we need to be careful that the total length of the wire on one of the windings does not approach $\lambda/2$ – the frequency at which this occurs will have zero output. So, we need short windings. In general, the impedance ratio equals the turns ratio squared, as shown above.

But the higher ratios become more difficult to wind, so it's often better to achieve a high ratio by using two transformers in series. For instance, if you want an impedance ratio of 16:1, use two 4:1 transformers. But remember, the two transformers cannot be the same because the input impedance required for the second transformer is quite different from the input impedance of the first as it must match the output impedance of the first transformer. For instance, if you wanted to connect to a high impedance off-centre-fed antenna with 50 Ω coax cable, you could use a pair of 4:1 ununs, the first going from 50 Ω to 200 Ω and the second from 200 Ω to 800 Ω.

Construction materials and methods

Earlier in this article, mention was made of the core heating/saturation problems which arise when a 60 Hz transformer is operated at 50 Hz, or a 220 V transformer is operated at 240 V. Of course, with any real transformer there are losses. It would be nice to use air-cored baluns because then magnetic saturation could never occur, but the physical size would be burdensome and the likelihood of approaching $\lambda/2$ wire length in the windings increases. So we use magnetic cores – mostly ferrites.

Ferrites have a frequency-dependent permeability, μ, which is high at the LF end, relatively flat in the middle range and then falls off at the HF end. At the LF end we need to be concerned about magnetising losses and at the HF end, the inter-turn capacitive losses. At the HF end there will be sufficient inductive reactance in the winding that we can ignore magnetising losses and the risk of reduced permeability. Even when the initial permeability falls as frequency rises, the ferrite core can be used as a former for an 'air-cored' inductor/transformer primary

Auto-transformer vs transmission line transformer

Auto-transformer

The inter-winding capacitance results in reduced bandwidth. And the best efficiency mid-band is often less than 95%.

Transmission line transformer

This is a broadband device – you can more than cover the amateur radio HF bands with one TL transformer. And the efficiency is greater than 99% for most of the pass-band.

Here is a typical set of curves comparing the auto-transformer and the TL transformer:

Figure 13 shows that the TL transformer has a broader pass-band and higher efficiency than the auto-transformer. The curve 'with no core' demonstrates the small effect due to reduced core permeability at the HF end, and the massive loss at the LF end.

For these reasons, I will stick with transmission line transformers from here on.

What characteristic impedance (Z_o) is needed inside the balun/unun?

We have discussed input and output impedance. What we are concerned with now is the impedance of the transmission line (TL) inside the balun/unun. Here, we use the normal TL transformer equation. This internal TL impedance should be the geometric mean between Z_{TX} and Z_{ACU} (when feeding a balanced ACU directly at the transceiver) or between Z_{TL} and Z_{AE} (when feeding such antennas as the OCF dipole, $5\lambda/8$ vertical or Yagi-Uda).

Some examples

- If Z_{TX} and Z_{ACU} both = 50 Ω, Z_0 = 50 Ω. Easy – we can use 50 Ω coax.
- If we are trying to feed an OCF dipole or $5\lambda/8$ antenna, assume Z_{TL} = 50 Ω and Z_{AE} = 200 Ω; so $Z_0 = \sqrt{(50 \times 200)} = 100$ Ω. Here we could use two parallel lengths of 50 Ω coax with only their shields bonded (ARRL Antenna Handbook, 1991:24.21) or see below.
- If we want to feed a 3-element Yagi-Uda antenna, where Z_{TL} = 72 Ω and Z_{AE} = 18 Ω, then Z_0 = 36 Ω. We could use strip-line for this.

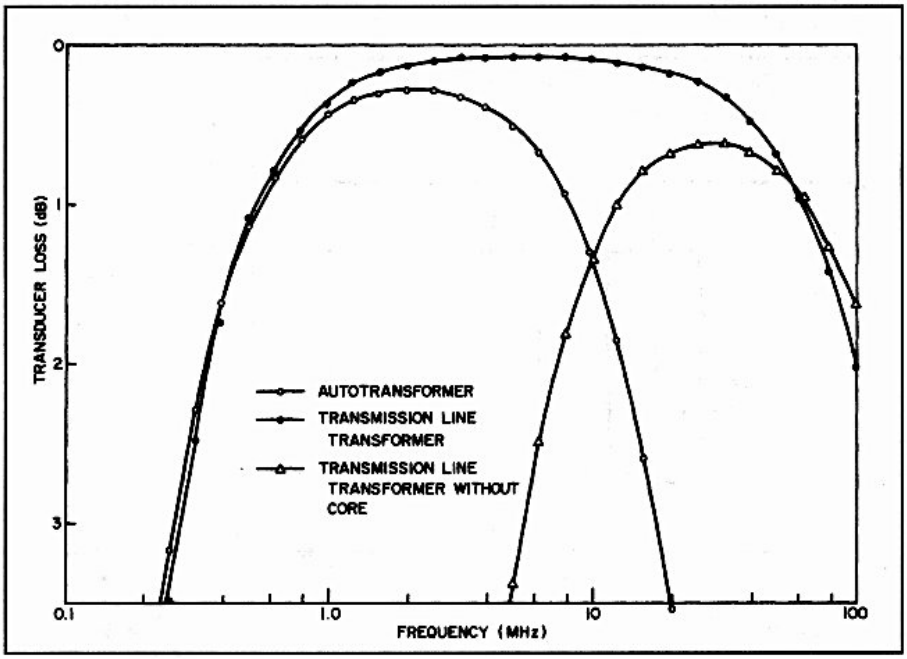

Fig.13. Transformer performance.

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TECHNICAL SPECIFICATIONS

HF Frequency Range:	1.8 to 60 MHz
Power Input Range:	3 to 100W (PEP) and 40W (continuous)
Input Impedance Range:	45 to 55 ohms
VSWR:	Typical: Less than 2:1
DC Input Requirement:	+13.8 VDC (nominal)
DC Operating Range:	+10.5 to 18 VDC
Input Current:	300 milli Amps
Average Tune Time:	Typical: Less than 2 seconds
Recurrent set time:	Typical: Less than 10 milliseconds
Memory Capacity:	170 non-volatile locations
Possible Tuning Combos:	1/2 million
Antenna Length:	7 feet (3.5 to 60 MHz) / 28 feet (1.8 to 60 MHz)
Installation:	Any position, ideal at antenna feed point
Operating Temperature:	-35 to +70 degrees C
Size:	9L x 7W x 1.85H inches
Weight:	2 pounds (approx 1 kilo)
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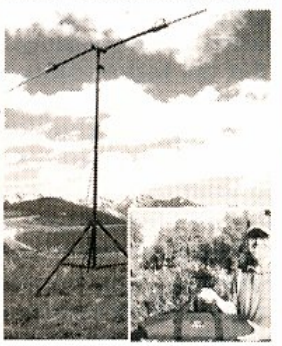
- BNC/PL259 coax connector assembly (includes RF beads) with 25' of RG58 coax
- Nylon "packcloth" carry bag with velcro strap,
- Black thermoplastic carry case; ops manual.



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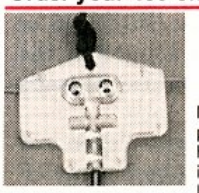

Ten-Tec 3003 Acro-Bat antenna hanger.

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How to roll-your-own balun/unun

Case 1 – Where a Z_0 of 100 Ω is required

The formula for the Z_0 of 2 parallel wires is

$Z_0 = 276 (\log (2s / d)) / \sqrt{\varepsilon}$

where

ε = dielectric coefficient of spacing material

s = distance between centres

d = diameter of wires

If we assume air spacing (ε = 1) and substitute our required 100 Ω into the formula, we get

$100 = 276 \log (2s / d)$

This gives s / d = 1.15; so, we can use almost any two wires, perhaps with a thin sleeve over one of them to achieve the 15% spacing, plied flat together.

Case 2 – Where a Z_0 of 36 Ω is required

The formula for the impedance of two flat strips is

$Z_0 = 138 (\log (4s / w)) / \sqrt{\varepsilon}$

where

s = spacing

w = width

ε = dielectric coefficient of spacing material

or, if w >> s

$Z_0 = 377s / w\sqrt{\varepsilon}$

If we assume that ε of the separator = 1.44 (eg, one of the plastics), and substitute our required 36 Ω into the formula, we get

$36 = 377 \times s / w\sqrt{1.44}$

from which s / w = 0.115.

So, get two strips of very thin copper, of width 4.42mm (approx 3/16") and roll them with two layers of 0.25mm (0.010") Mylar® or Teflon® tape. You may even be able to get some of the powder-coated strip that MM Metals has been experimenting with, to achieve the same effect, without the difficulty of holding the two copper strips and the two layers of insulating tape together.

Note: The thickness of the copper strips does not enter into our impedance calculations. The cross-sectional area of the strips determines the current limit at LF, but at HF and beyond, the thickness of the strip becomes the limit as the effective area diminishes with frequency. So, we need thicker strip just to meet plain dc thermal requirements. (see Terman, 1955:22)

How many turns?

Now we have yet another impedance to consider – the magnetising impedance of the primary winding.

If there are not enough turns, there will be insufficient primary inductance and at the LF end the core will overheat, resulting in a permanent loss of permeability. If there are too many turns and the current level is maintained:

- we are likely to saturate the core (B = μNI) giving rise to distortion, spurious signals and heating,
- we will get reduced transformer action at the HF end because of capacitive coupling between the turns, and
- we may approach a winding length of λ/2 at some frequency.

Formula for inductance

For this discussion, I have assumed you want to transmit at least 100 W. To

keep the balun size reasonable, I have assumed we will use a ferrite core. The inductance we need to calculate is the magnetising inductance, L_M. For a toroidal core, this is

$L_M = 0.4\pi N_P^2 \mu_0 (A_E / l_E) \times 10^{-8}$ Henry (Sevick, 1990:2.2)

where

N_P = number of primary turns – always a whole number

μ_0 = initial permeability of the core at the lowest frequency of interest

A_E = cross-sectional area of the core

l_E = magnetic path length in the core

Many texts and core providers reduce this formula to

$L_M = kA_L N_P^2$ Henry

where

k = a constant

A_L = the inductance index for a particular core

(See *ARRL Handbook* (1991:6.25); Langford-Smith, F (1960:445); Terman (1955:ch2) and the Amidon information sheet)

The formulae for rod ferrites are much more complex because of the high-reluctance air section in the magnetic path

The number of turns is a compromise between upper and lower 0.45 dB points. Why 0.45 dB? This represents about 10 % losses, which is just about acceptable. It can be shown that (see Appendix 2 for a derivation of this.):

$X_M = 3 \times Z_{AE} / 2$.

If we substitute this in the formula for the number of turns, we get the approximation:

$N_P = \sqrt{(2 \times Z_{AE} \times I_E \times 10^7 / f \mu_0 A_E)}$

Now, we want high permeability μ_0, a large core area A_E, and small core length l_E to give us a small-diameter, squat toroid.

If operating at 10 MHz, assume $\mu_0 = 100$ and $Z_{AE} = 50\ \Omega$, and we get:

$N_P = \sqrt{(l_E / A_E)}$.

An example

For $Z_{AE} = 300\ \Omega$, and operating at 1.8 MHz, we need to multiply the above approximation by

$\sqrt{(300 / 50 \times 10 / 1.8)} = 5.77$

just to compensate for the change of impedance and frequency.

If we choose the model FT-240 toroid with $A_E = 1.57$ cm^2, and outer diameter = 6.096 cm, then $l_E = 14.40$ cm.

Thus $l_E / A_E = 9.17$ and hence $\sqrt{(l_E / A_E)} = 3.03$.

So, $N_P = 5.77 \times 3.03 = 17.47$ turns, say 18. (we can't use partial turns with a toroid).

Another example

Building on what we learned in the previous example, let's say we want to use a bit more power; so we choose a ferrite with the same dimensions but with an initial permeability $\mu_0 = 300$ to reduce the losses.

If this were to operate at 1.8 MHz and now feed a 50 Ω dipole, then: $N_P = 3.03$ [toroid dimensions] x $\sqrt{(300 / 50)}$ [impedance change] x (100 / 300) [permeability change]

$= 3.03 \times \sqrt{2}$

= 4.29 turns (use 5 turns)

Choice of ferrite mix

You will recall that inductance L is proportional to N^2 and μ. As you can see from Figure 14 below, μ is flat up to a knee and then falls off with frequency. Because inductive reactance X_L is proportional to L and frequency (ie, to f, N^2 and μ) then as the frequency increases and μ falls, the (f x μ) product remains essentially constant. Thus the reactance X_L of the magnetising inductance becomes proportional to N^2.

Generally, it is recommended that you avoid iron powder mixes because they have lower permeability and therefore require more turns, and have a smaller operating frequency range.

Don't be put off by people who say you must choose a ferrite that has the frequency range – ask to see the curve of μ vs frequency. You can use a ferrite characterised for 10 to 20 MHz (eg, type 61) to well beyond 100 MHz.

Have a careful look at your RF PA design to see if there is any chance of dc getting into the transformer primary. If dc flows in these windings, the permeability will fall and heating will occur. If lightning hits your balun/unun, you can be fairly certain that the safe operating temperature will have been exceeded and you will need to replace the core.

Use the largest cross-section ferrite you can afford in order to keep the power loss per unit volume low; then the temperature rise is unlikely to reduce the permeability. This is always countered by the need to keep the length of windings well below λ/2. If

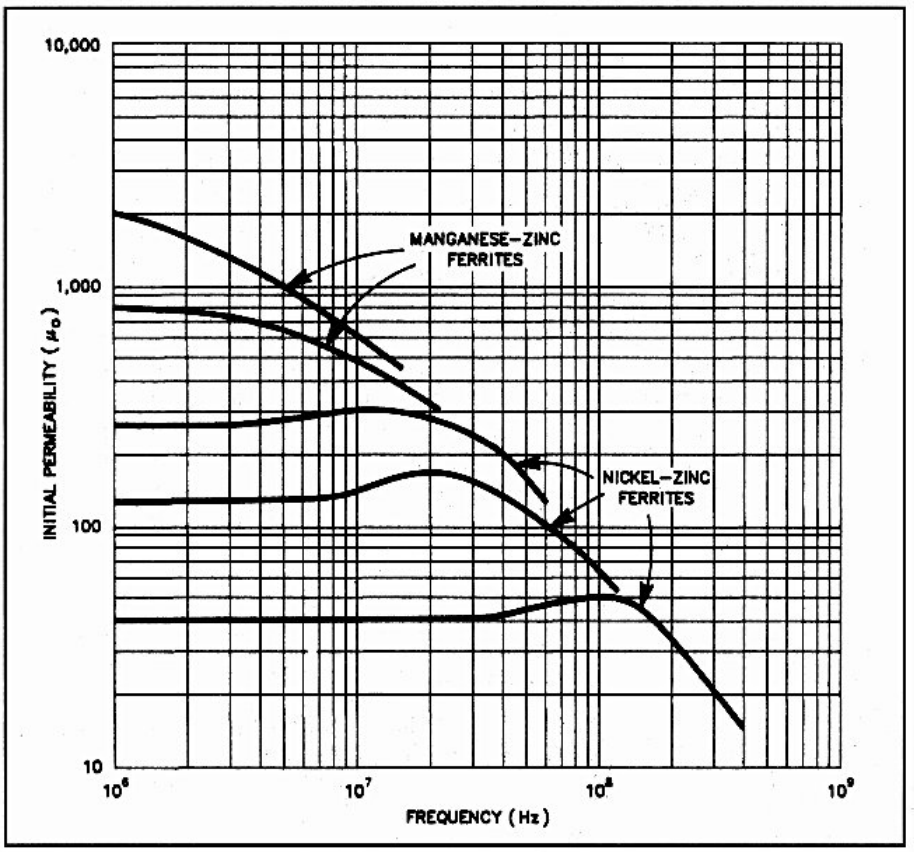

Fig 14, Initial permeability vs frequency for common ferrite cores (Fig 3-13, Transmission Line Transformers [1990] by Jerry Sevick, ARRL, p3-14).

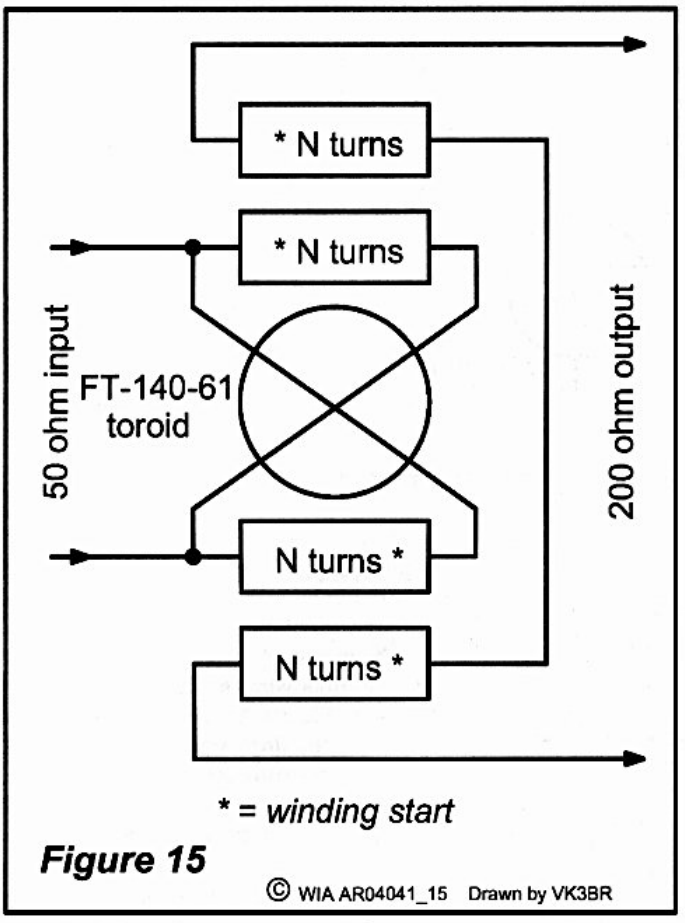

Fig 15. A 4:1 transmission line balun, unun or balbal.

the temperature exceeds 100°C on a regular basis, choose a larger core and wire size or you will exceed the Curie point and damage the core permanently. The higher the initial permeability, the fewer turns required for low frequency performance, the less the inter-turn capacitance and hence, the better the high frequency performance, and the lower the ohmic losses. However, it is wise to choose a ferrite whose initial μ is less than 300 – much more than that and efficiency falls, leading to more heating.

As your operating frequency rises, the current flows more and more on the surface of the wire. Heating thus increases, so the safe power input falls. You can overcome this by using larger gauge wire or tubing.

Some practical advice:

- If you break a ferrite toroid, use an isocyanacrylate glue (eg, Super Glue®) to cement all the broken parts together. Ensure that all air gaps have been excluded, so that you don't increase the reluctance of the magnetic circuit. Be careful – isocyanacrylates degrade with temperature.
- Ferrites are ceramics and so are very good insulators – there is no need to insulate cores before you wind any conductors onto them.

Practical 4:1 baluns

Case 1 – 50 Ω to 200 Ω

Suppose we want to feed an OCF antenna with RG-58 coaxial feed line. The antenna Z_{AE} = say 200 Ω and Z_{TL} of the RG-58 is 50 Ω. A TL design of balun requires a Z_0 of 100 Ω. A bifilar wound coil using 1.0 mm enamelled copper wire, wound on a FT-140-61 ferrite core, can achieve this. You will need about 3m of wire, folded in half.

1. Tie the two wires together, flat, with small cable ties or even Sellotape®. Avoid twisting.
2. Feed in 7 or 8 turns to get the LF performance, spaced evenly around one half of the toroidal core to reduce inter-turn capacitance.
3. Tie the winding in place with cable ties.
4. Now wind in and secure another 7 to 8 turns, exactly as before, spacing them on the other half of the core. What you have now is two 100 Ω TLs giving two 1:1 transformers.
5. Connect one winding of each pair in parallel to provide the 50 Ω primary.
6. Connect the other two windings in series to provide the 200 Ω secondary.

See Figure 15 for connection details. The start end of each winding is indicated by x.

You should pay no more than $13 - $15 for a FT-140-61 toroidal core. Try TTS Systems for cores and specification sheets – there is an advertisement in every issue of AR magazine.

Case 2 – 75 Ω to 18.75 Ω

This is the kind of balun you require to feed a three-element Yagi-Uda antenna from RG-59 coaxial cable. Here, the required characteristic impedance of the TL transformer is 37.5 Ω. If you look back a bit in this section you will find that strip-line can be suitable for this impedance. If you go through all the calculations, you will discover that the strip needs to be about 4.5 mm wide. Then follow the rest of the instructions for constructing your strip-line transmission line balun.

A Yagi-Uda antenna for 40 m is out of the question for most of us. How about a 20 m beam? So, our lowest operating frequency is 14 MHz. How many turns do we require on a core (such as FT-140-61) whose permeability is 125?

Recall, we arrived at the formula $N_P = \sqrt{(l_E / A)}$ when operating at 10 MHz, and when μ = 100 and Z_{AE} = 50 Ω.

If we use the FT-140-61 core, we discover that $l_E / A = 11.19$. Correcting for different permeability, impedance and frequency, we get:

$N_P = \sqrt{((l_E / A)(100 / 125)(75 / 50)(10 / 14))}$.

Note: We have used the 75 Ω impedance for calculating magnetising inductance because the primary, which supplies the magnetising current, is 75 Ω.

So, $N_P = \sqrt{((11.19)(0.8 \times 1.5 \times 0.70))} = 3.10$; we would use 4 turns.

We could use the same wiring layout as for the previous balun and so follow the same construction steps, this time with 4 turns of our strip-line on each half of the toroid. The parallel connections go to the 18.75 Ω antenna and the series connections to the 75 Ω coaxial cable.

Because of the effort required to make a strip-line transmission line, you might allow for the possibility of a 40 m beam. Think big! So, if you choose to wind 5 turns instead of 4, the lower 0.45 dB point will be about 5.4 MHz and such a design would easily perform from 7 MHz to 70 MHz.

For complete balun kits, try http://www.ozgear.com.au/balun/ToroidalBalunKits.htm

What if there is a mismatch?

Recall from the earlier material that antenna impedance changes with frequency.

So, if the characteristic impedence of the balun is greater than optimum for your operating frequency, remember that:

- The resistive part of Z_{IN} increases slightly with frequency and Z_{OUT}
- The reactive part of Z_{IN} is positive and increases with frequency and Z_{OUT}.

And, if the characteristic impedance is less than optimum for your frequency:

- The resistive part of Z_{IN} decreases greatly with frequency and Z_{OUT}
- The reactive part of Z_{IN} is negative and increases with frequency and Z_{OUT}.

Summary on baluns

Here are the main considerations when designing and constructing baluns/ ununs:

1. Frequency range – with a ferrite core, the whole of the amateur HF spectrum (possibly to 6 m) can be covered by one balun
2. Impedances – operate at constant impedances, in and out, whenever possible; though going too high is better than too low
3. Matching – the output impedance should match the downstream device to meet the Jacobi criterion
4. Turns ratio and impedance ratio – there are problems with power bandwidth when high impedance ratios are attempted
5. Transmission line impedance for matching input to output – the geometric mean formula
6. Magnetising flux – the number of turns required to get the appropriate flux
7. Construction materials and methods
8. Power handling capability.

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- *ARRL Handbook* – any edition should do
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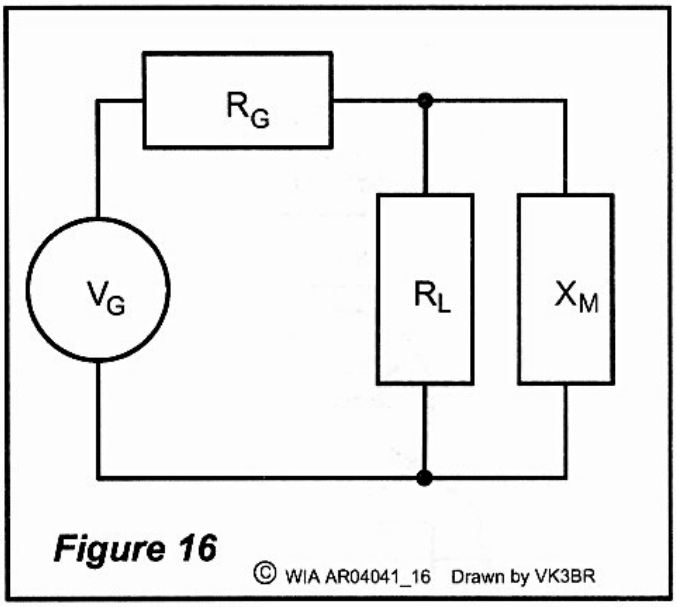


Fig 16.LF model of antenna connected to the magnetising inductance of the balun/unun primary.

Appendix 2

Balun design – calculation of minimum LF inductance

(borrowing from Sevick, 1990:2-3)

This derivation of the relationship between the magnetising reactance X_M and the source impedance R_G, for a nominated operating bandwidth, relates to the earlier discussion on balun design under the heading, "Formula for inductance".

All power amplifiers have an internal resistance, R_G, which we try to match to our antenna impedance Z_{AE}, in order to meet the Jacobi requirements for maximum power transfer from generator to load. Figure 16 represents the LF model of the antenna connected to the magnetising inductance of the balun/ unun primary.

When the Jacobi condition is met,

$R_G = R_L$ and so, $V_{RL} = V_G / 2$.

The maximum power available to the load is therefore:

$P_A = (V_G / 2)^2 / R_G$

The equation for LF efficiency can be written as

$\eta_{LF} = P_{LOAD} / P_A = 4X_M^2 / (R_G^2 + 4X_M^2)$

where $X_M = 2\pi fL_M$ (recall, L_M is the magnetising inductance of the primary of our balun).

While it is usual to measure the frequency response in audio circuits at the –3 dB points, that represents a 50 % loss in a power device. For the balun, our design target is a 10 % loss, corresponding to 0.45 dB. This means an efficiency η_{LF} of 0.9 or 90 %, and to obtain this result from the above formula:

$4 \times X_M^2 = 0.9(R_G^2 + 4X_M^2)$

Solving this, we get

$2 \times X_M = 3 \times R_G$

ar

Silent Key

Maurice Talkes VK3VTW,

member of the Geelong Amateur Radio Club, passed away May 30th after a short illness.

submitted by H.J. Virgo VK3DVY.

A miniature variable DC supply

Jim Tregellas VK5JST

I found myself in the workshop recently, looking at a pile of unwanted AT and ATX computer power supplies and wondering what to do with them. They seemed too good to throw out but were definitely in the way of progress. "Great free boxes for projects" I thought, "but what can you put in them? How about a variable supply? And yes, I can mount one of those big lumpy expensive heatsinks where the fan goes. But, wait a minute, how about using the fan (which comes free) for cooling?" And so was born an idea.

Probably the most useful general purpose supply one can have has specs like 0-20V DC at around 1 amp maximum. This allows experiments to be conducted using both digital chips, linear ICs such as op amps and timers, and standard transistors, etc.

If you are a typical experimenter like I am, the supply must feature protection against voltage spikes coming from things like DC motors, relays and other inductive loads which you will one day connect to the output terminals, together with the ability to operate into a short circuit for an unlimited time without damage. It must also exhibit perfect stability when subjected to a rapidly fluctuating load. Furthermore, large spikes on the supply mains should not stop it working either. So there was a target spec - a bulletproof supply delivering 0-20 V at 1 amp with very good load regulation. And if a variable current limit could be included to cover things like battery charging, and the switch-on of a test circuit with faults (without destroying all the semiconductors) so much the better. This last feature is only very rarely provided, and then only on top grade laboratory supplies.

One of the major problems associated with the design of any variable supply is getting rid of the heat which is generated when either a short circuit or a low voltage high current load is connected to the output terminals. For this supply, at least 27 watts has to be dumped under short circuit conditions (an input to the regulator circuit of at least 27 volts is necessary if the 20 volt maximum output is to be free of ripple).

Now this doesn't sound like much until you do a bit of homework. If any reasonable size heatsink is picked from either the Jaycar or DSE catalogues, e.g. type HH8566 of Jaycar, it will have a thermal resistance of at least 2 deg. C/W. At an ambient temperature of say 30 deg. C, this gives a heat sink operating temperature at full load of 84 deg. C, which is much too hot. You can burn your hand on this and it will ultimately cook the electronics inside the box too.

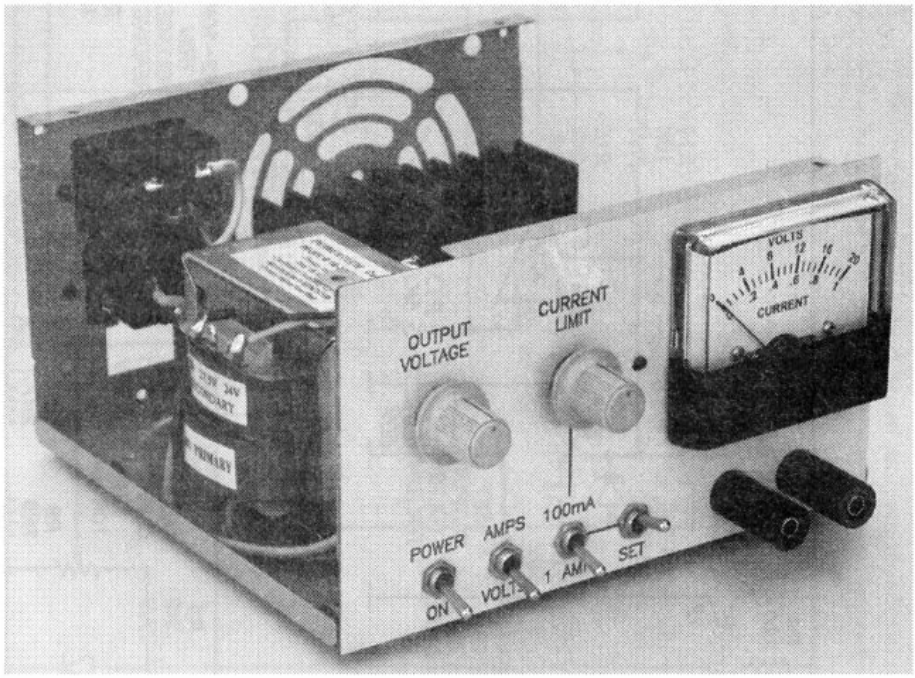


Photo 1. Front panel view.

The problem is that this is continuous power which must be dissipated (these sinks are okay for audio amplifiers which have peaky outputs and low average power dissipations). What is highly desirable is a sink with a thermal resistance of maybe 1 deg. C /W or less. Try finding one of these in a reasonable size!

Now this is where the fan comes in. Even with a moderate draught, the thermal resistance of a heatsink drops dramatically and some tests with a standard computer fan and a Jaycar HH8518 heatsink (normally 7 deg. C/W) show that 0.5 deg. C/W is easily achieved. So in a 40 deg. C environment the sink reaches 53 deg. C which allows safe continuous operation into a short circuit. And this sink is small and only costs $2.70!

The fan should be arranged so that cool air is first blown past the electronics and transformer and then finally over the heatsink and out of the box.

If you have a power supply case with large ventilation slots on both side panels of the lid, the fan can be mounted externally at the rear of the case saving you from having to cut a large hole in the lid top.

If the fan grille at the case rear is not flat, (preventing external mounting of the fan) cut the grille out leaving a large circular hole. This type of case simplifies the metal work considerably and only leaves you with holes to cut

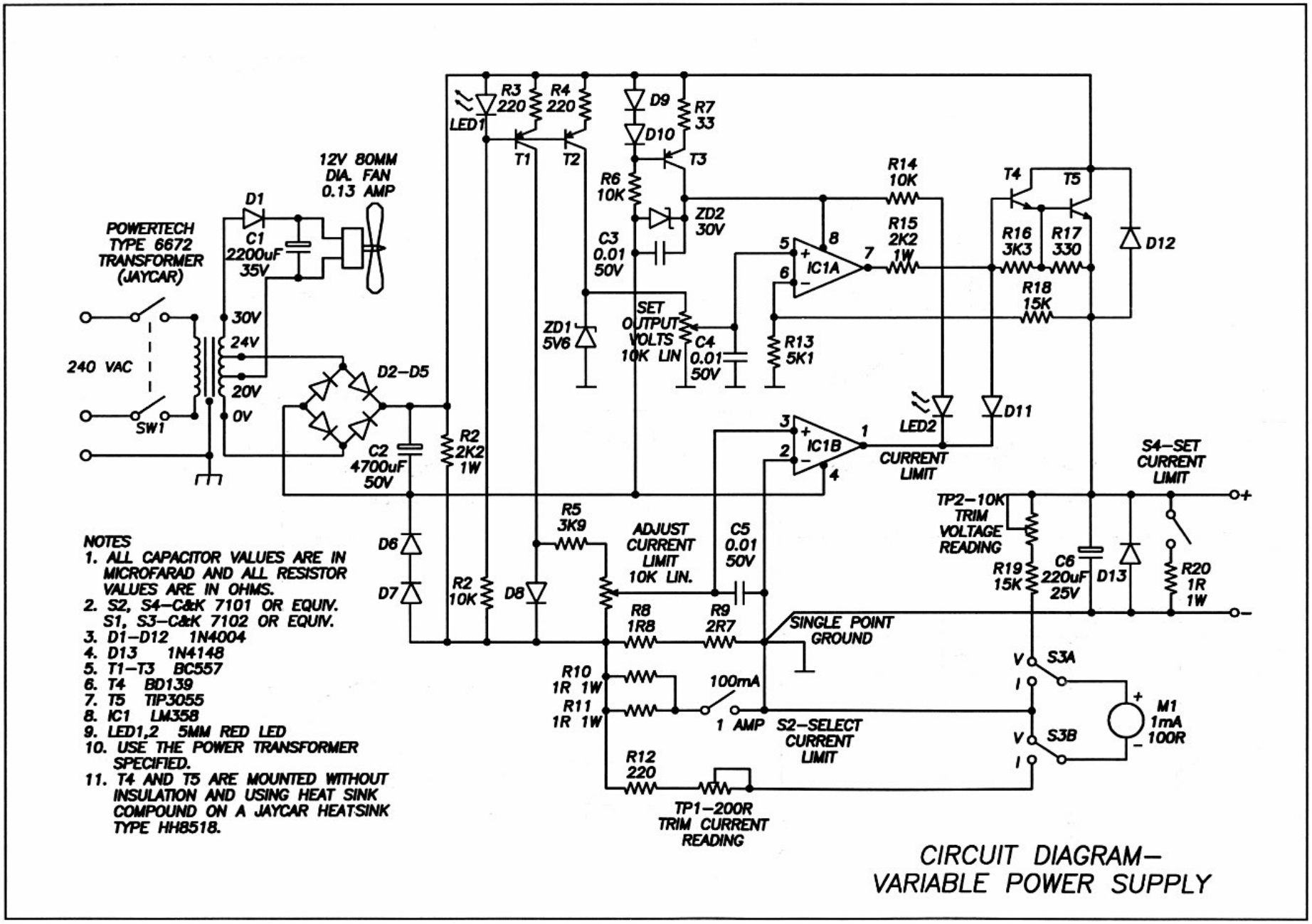
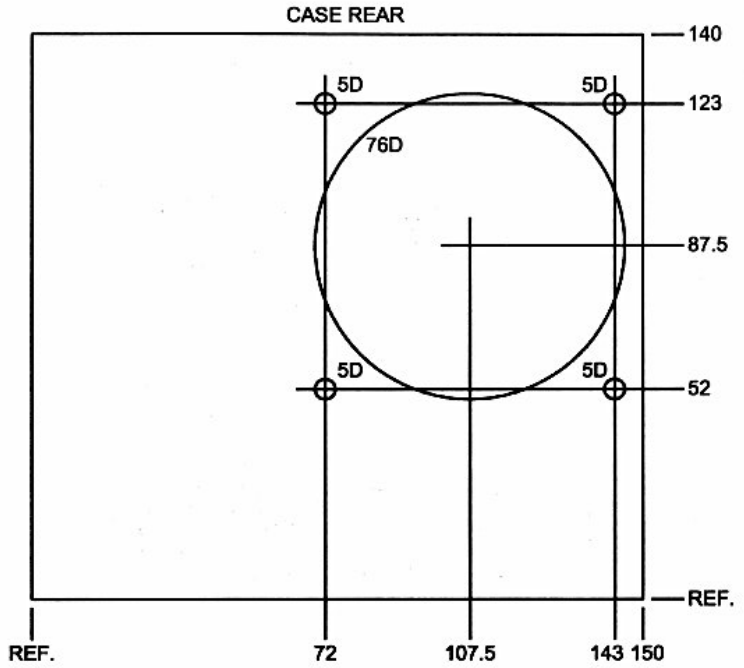
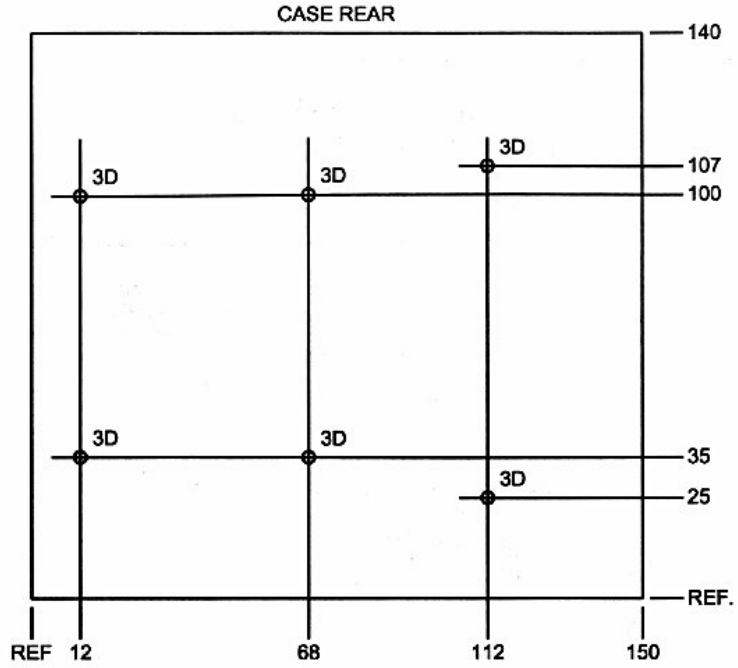


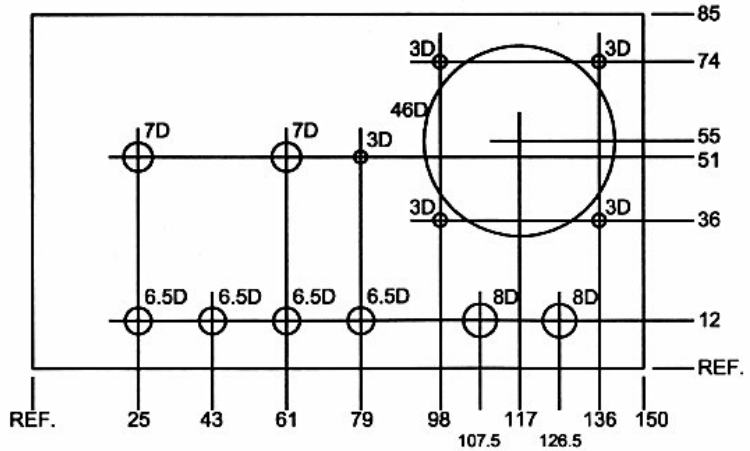
Fig 1. Circuit diagram



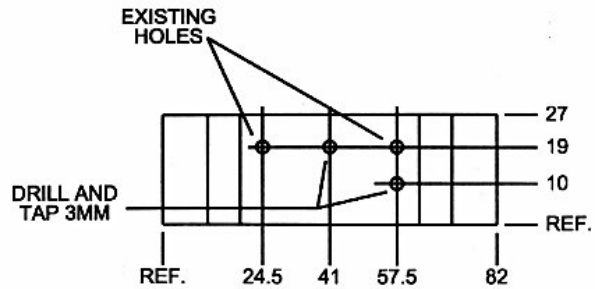
CASE LID DRILLING DETAILS
(OUTSIDE VIEW)



CASE BOTTOM DRILLING DETAILS
(OUTSIDE VIEW)



FRONT PANEL DRILLING DETAILS



HEATSINK DRILLING DETAILS

JAYCAR PART NO. HH-8518
BOTTOM VIEW

Fig 2. Mechanical drawings for the front panel, case and heatsink.

in the steel front of the case and matching laminex (or similar material) front panel. Details of this, and the holes to be drilled in the case bottom are given in the drawings.

How it works

The supply output voltage is controlled by comparing a sample of the supply output (from voltage divider R18 and R13) with a clean reference voltage provided from ZD1 via the wiper of the SET OUTPUT VOLTS pot.

An error amplifier IC1A shifts the output voltage until the voltages at its two inputs (pins 5 & 6) exactly match.

If the pot wiper is set to the top of its travel and pin 5 = 5.6 volts, then the output voltage must rise to just over 20 volts for this matching to occur.

Likewise if the pot wiper is set to minimum and pin 5 = 0 volts, then the output must also move to 0 volts.

The super clean reference voltage of 5.6 volts is derived by a process of double zenering.

A red led (LED1) applies around 1.8 V across R7 and the base emitter junction of T2. Therefore about 1.15 V appears across R7 (220 ohm) setting the collector current of this transistor to around 5 ma. This collector current is quite free of ripple due to the diode action of the LED, and any remaining ripple is further reduced by passing this constant current of 5ma through the 5.6 volt zener.

The result is a laboratory grade voltage reference of 5.6 V with a remaining ripple of around 200 micro volts.

An identical technique is used (T1, R3, D8 and R5) to develop a ripple free reference voltage of 0.45 volts across the ADJUST CURRENT LIMIT potentiometer. Depending on the position of S2, the output current passes through either 4.5 ohms (R8, R9) or 0.45 ohms (R10, R11, R8, R9) producing a voltage of up to 450 millivolts across these current sensing resistors and providing output current ranges of either 0 – 100 mA or 0 – 1 amp.

This voltage is applied to M1 via R12 and a trimpot to indicate supply output current, and is also compared with the voltage present at the wiper of the

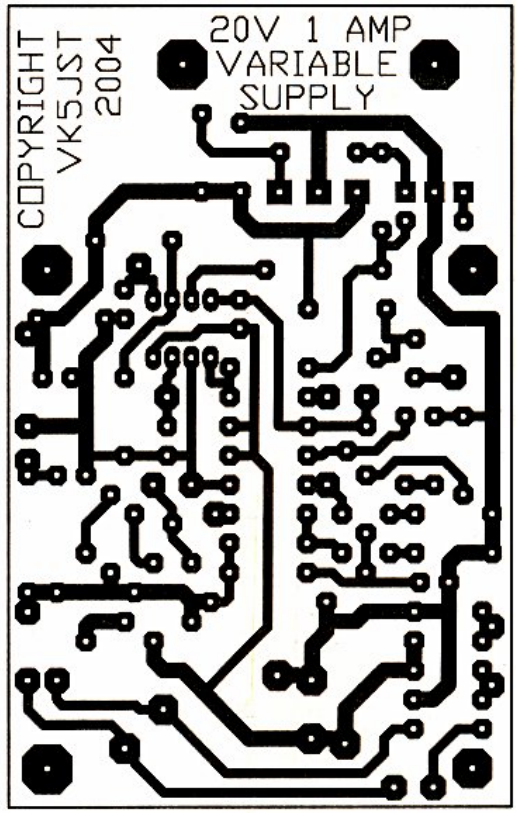


Fig 3. The PCB artwork.

ADJUST CURRENT LIMIT pot. If more current is demanded by the load than has been set by the user, the error amp output (IC1B pin 1) moves negatively turning on the current limit led (LED2) and stealing base drive current from the Darlington output transistors, T4 and T5, until the current limit set by the user has been achieved. Note that R15 allows IC1B to always sink more current than IC1A can source.

The last part of the circuit requiring clarification is T3 and its associated components. The voltage regulation of small transformers such as the 6672 is never good (typically 20%) and under conditions of no load the dc rail voltage

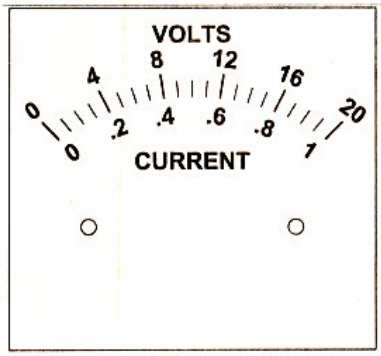


Fig 4 – Meter scale artwork.

rises to around 35 V. This is in excess of that allowed for the LM 358. Under conditions of full load the rail drops to around 28 V. T3 is yet another constant current source which, with a 35 V rail supplies around 18 mA to a combination of the op amps and the zener diode. This limits the maximum supply to the op amps to 30 volts and also protects the op amps from spikes on the main AC supply. When the supply rail drops below 30.6 volts the zener switches off and T3 goes into saturation, supplying only the current demanded by the op amps and providing a supply voltage to the op amps of only 0.6 volts less than the supply rail. Spike protection of the supply is also enhanced by D12 & D13 which bypass spikes from either the load or ac mains around the regulator circuitry. Last, the components D6 & D7 together with bleed resistor R2 provide a negative rail for the op amps which is 1.6 volts below the negative supply terminal. This allows the op amps to pull the output voltage right down to zero.

Construction

The first item to be made is the laminex front panel.

After carefully marking out and drilling this item, use it as a template to produce the holes in the metal work so that the two items exactly match. Depending on exactly where the ventilation slots in the case metal work occur, it may pay you to slightly adjust the position of some of the front panel holes.

Drill the holes in the case bottom, and if appropriate, add the holes in the case lid for the fan (see earlier comments). Lettering can be added to the front panel using Letraset or similar, and protected with a light overspray of low gloss polyurethane lacquer.

Next, drill and tap the two additional holes required in the heatsink and mount T4 and T5 on the underside of the sink. No mica or silicone rubber washers are necessary but use thermal grease to ensure good thermal contact.

Fabricate the printed circuit board and mount all components. The heatsink is attached to the PCB using long 3 mm

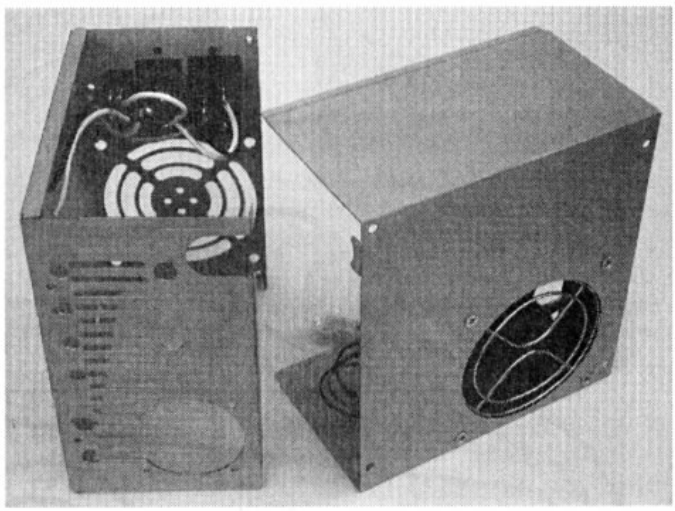


Photo 2 – Modified metal work of the case.

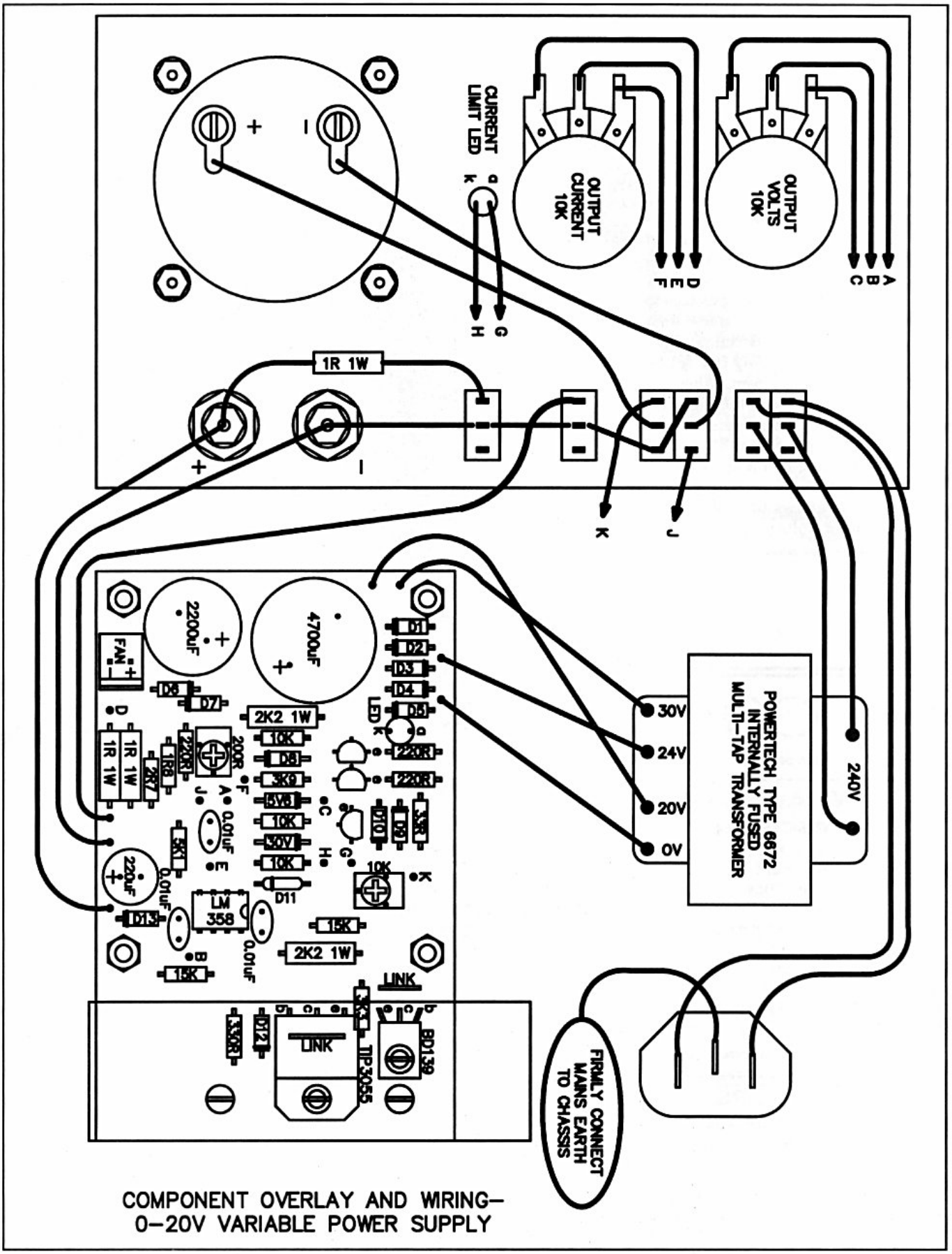


Fig 5. The PCB component overlay, etc.

screws and 12 mm long 3 mm bore spacers. The leads from T4 and T5 are bent as close as possible and at right angles to the transistor bodies.

Provide long multi-coloured flying leads for all connections from the PCB to the front panel and transformer. Remove the fan connector from the old power supply PCB and use it on the new one.

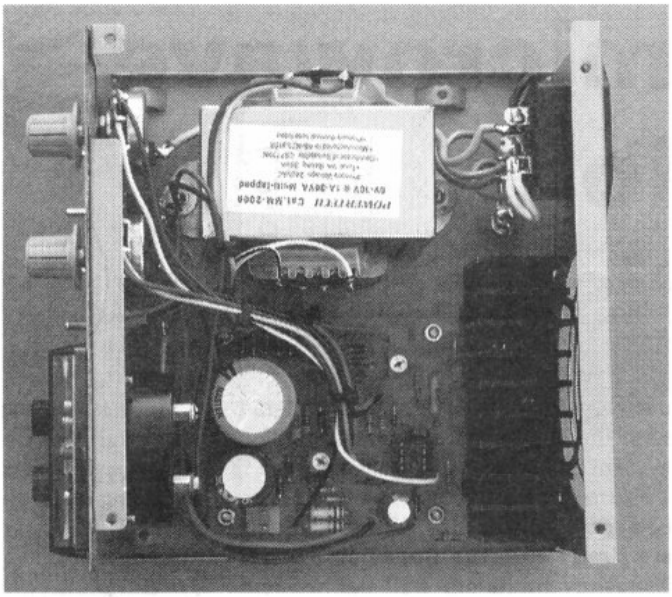


Photo 3 – Plan view of the assembled power supply.

Mount all hardware except the transformer, and complete all wiring except for the leads to the transformer. Screw the transformer into the case and add the wiring to it.

Ensure that physical contact with 240 volt ac mains is not possible by covering any exposed part of this wiring with heat-shrink tubing. Plug in the fan but do not screw down the lid yet. You are now ready to test.

Testing

Set all potentiometers and trimpots to half travel and check that S3 is set to monitor output voltage.

Set the current limit switch (S2) to 100 mA and ensure that the supply output is not shunted by S4.

Briefly apply the mains and check that the voltmeter reads up scale and can be varied using the SET OUTPUT VOLTS pot.

Next, close S4 and set S3 to monitor output current. Briefly apply the mains and confirm that the output current can be varied using the ADJUST CURRENT LIMIT pot. Open S4.

Place a DVM on, say, its 1 amp dc range across the output terminals to monitor supply short circuit current.

Reconnect the mains to the power supply and adjust TP1 so that the current meter reads correctly.

Confirm that the current meter reads correctly with the power supply set to deliver up to 1 amp.

Select the 200 volt dc range on the DVM, set S3 to measure output voltage and adjust TP2 so that the supply voltmeter reads correctly. This completes testing.

Specifications

All measurements taken with an output of 20 Vdc

Load regulation:- less than 1 mV output change for output currents from 0 – 0.95 amps

Line regulation:- less than 1 mV output change for AC mains inputs from 220-260 Vac

Hum and noise:- less than 1 m VRMS at an output current of 0.95 amps

Note that it is not possible to set an output voltage if the supply current limit is set to zero!

ar

Correction

We have to correct the calculation on page 15 right hand column of the May issue of AR .

1.3 dB as a power ratio is calculated as follows:

antilogarithm of 1.3/10 = a'log 0.13 = 1.3489629, approx

To calculate the loss, take the inverse and subtract from 1.0

The inverse = 0.7413102 pu

The loss = 1.0 - 0.7413102 pu = 0.2586897 pu, or approx 26%.

Not 36 % as quoted in the article.

VHF and microwave propagation characteristics of ducts

Part 2

Andrew L Martin, VK3KAQ

Observation and theory

Ducts occur in meteorological conditions where the temperature increases with increasing height over a distance of a few 10s of metres, instead of decreasing with increasing height as is normal in a well mixed atmosphere. Regions where the temperature increases with height are called temperature inversions. An example of an elevated temperature inversion is shown in Figure 8 where at around 580 m the temperature increases over a short distance from about 18 deg C to about 24 deg C at 680 m. Above and below this point the temperature is seen to decrease with height in the normal way.

Such temperature inversions trap water vapour below them to form a duct as shown in Figure 8 where at around 580 m the water content decreases from about 8 gm/kg below the temperature inversion to 3 gm/kg above the inversion. A corresponding dramatic decrease in humidity that is associated with the temperature inversion is also evident in Figure 8.

From amateur observations the two most outstanding effects of ducts are firstly that the upper and lower frequency limits are well defined and have something to do with duct strength and secondly, locating antennas closer to a duct is better for achieving long distance contacts. These effects will be used to validate the equations that describe duct behaviour. Several other observed effects are noted later.

The most common way to calculate a duct profile is to obtain the modified refractive index M [16] from:

$$M = \frac{77.6}{T}\left(P + \frac{4807\,xe}{T}\right) + 0.157xh \quad (1)$$

where:

T is temperature in degrees Kelvin
P in the pressure in hectopascals
h is the altitude in metres

and e is the vapour pressure given from:

$$e = 6.1078x10^{\{7.5xTd/(237.3-Td)\}} \quad (2)$$

where T_d is dew point temperature.

A series of duct M profiles is shown in Figure 9 where the characteristics of the different types of ducts are evident. The approximate dimensions for each type of duct are also given.

The data to calculate the M profiles can easily be obtained [15]. Using equations (1) and (2) an M profile for the data of Figure 8 is calculated and shown in Figure 8. This M profile indicates the presence of an elevated duct at 600 m (see Figures 8 and 9). The elevated duct position in Figure 8 corresponds to the increase in temperature and a decrease in humidity and further corresponds to the increase in signal amplitude from the SODAR measurements of Figure 4 taken at the same time. A change in wind direction is also associated with the duct, the wind shear also being seen in the SODAR data of Figure 7. The water vapour content decreases above the duct indicating that water vapour is trapped by the temperature inversion.

The elevated duct has a depth of 350 m, a width of 35 M units and a duct gradient *dM/dh* of *0.71M/m*, Figure 1. Typical values for duct gradients are between 0.1 (weak gradient) and 2 (strong gradient). The size of the duct (depth and width) determines the minimum frequency, equation (3) while the strength of the duct (gradient and depth) determines the entry and exit angles for the duct, equation (4).

Having set out the basic properties of a duct, the propagation characteristics can now be investigated. An estimate of the longest wavelength that can be propagated by a duct using the duct dimensions can be estimated from [17]:

$$\lambda_{min} = 0.6 \times A \times D \times \sqrt{\Delta M} \quad (3)$$

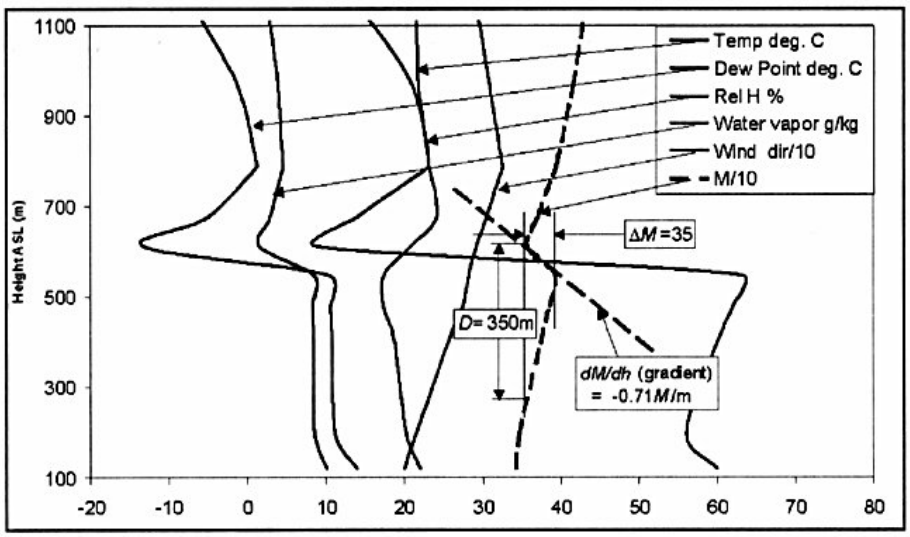


Figure 9. M profiles for various types of ducts. The depth of each D duct is shown for each type of duct. The M profile for a standard atmosphere (a), an evaporative duct has depths of up to 40 m (b), surface ducts have depths up to 300 m (c and d) and elevated ducts have depths up to 300 m at heights between 400 m and 1400 m(e). Elevated ducts also occur above 1400 m but are of limited interest to amateur operators.

where:

A is 3.77×10^{-3} for a surface duct and 5.66×10^{-3} for an elevated duct

D is the depth of the duct in metres

ΔM is the maximum difference in the modified refractive index within the duct.

The maximum wavelength that can be transported for a range of measured ducts is shown in Figure 10 [17]. This concept of a maximum wavelength (minimum frequency) that a duct will support is consistent with all of the amateur observations. For the data from Figure 8, and using Figure 10, the minimum frequency that could be transported by this duct is about 60 MHz (5 m) as it is quite a large duct. As the depth of the duct becomes shallower, shorter maximum wavelengths are supported as shown in Figure 10.

The amateur observations show there is also a maximum frequency that a duct can support. This is further confirmed by the work of Baker and quoted by Howse [5]. This is an issue because the current theory does not indicate that a duct has a maximum frequency as well as a minimum frequency.

It may be that in fact the entry into and exit from the duct is frequency dependent and provides an explanation for the observed effects. A formula from [18] gives the critical angle Φ_t at which a signal can be trapped by a duct:

$$\Phi_t = 7.39 \times 10^{-2} \times \sqrt{(|dM/dh|) \times D} \quad \text{deg.} \quad (4)$$

where:

$|dM/dh|$ is the magnitude of gradient of modified refractive index.

The duct parameters of Figure 8 give a trapping angle of 1.16 degrees. Equation (4) assumes that the refractive index gradient is linear over the whole duct and that the surface of the duct is smooth. As (4) is not frequency dependent, it indicates that all frequencies above f_{min} would be trapped by the duct. It is most likely that (4) is very conservative and that the duct structure is more complex resulting in a gradual low and high frequency cut off rather than one well defined low frequency boundary suggested by (4). The observations show that trapping by a duct has a lower and upper frequency limit. There is thus a need to arrive at a better understanding of the mechanisms involved.

By modifying equation (4) to include a frequency dependent ratio, the author developed a formula that better describes the trapping by a duct as a function of frequency and duct parameters. This formula (5) is now more consistent with the observations. The concept of this modification of (4) is that the duct trapping angle is reduced by the ratio of the duct minimum frequency to the operating frequency. This formula can be used to estimate the maximum trapping angle Φ_{tf} for any given frequency to enter into a duct. For duct trapping angles greater than Φ_{tf} the given frequency will not be trapped by the duct and will pass through. This addition of a frequency dependent ratio to (4) now provides the observed frequency dependence so that:

$$\Phi_{tf} = \Phi_t \times f_{min}/f \quad \text{deg.} \quad (5)$$

where:

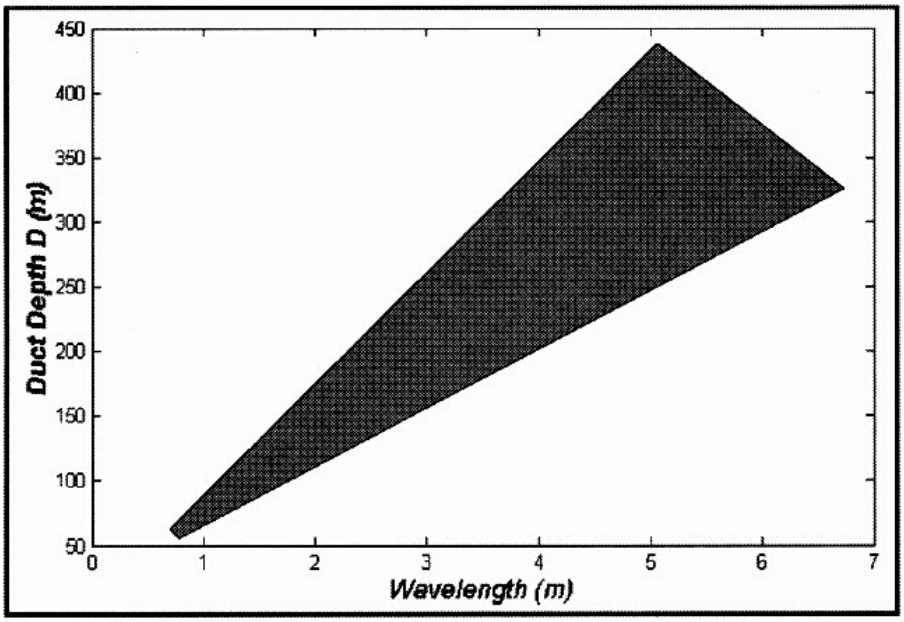


Figure 10. The range of maximum wavelengths that could be transported by a duct of particular depths calculated from measured data.

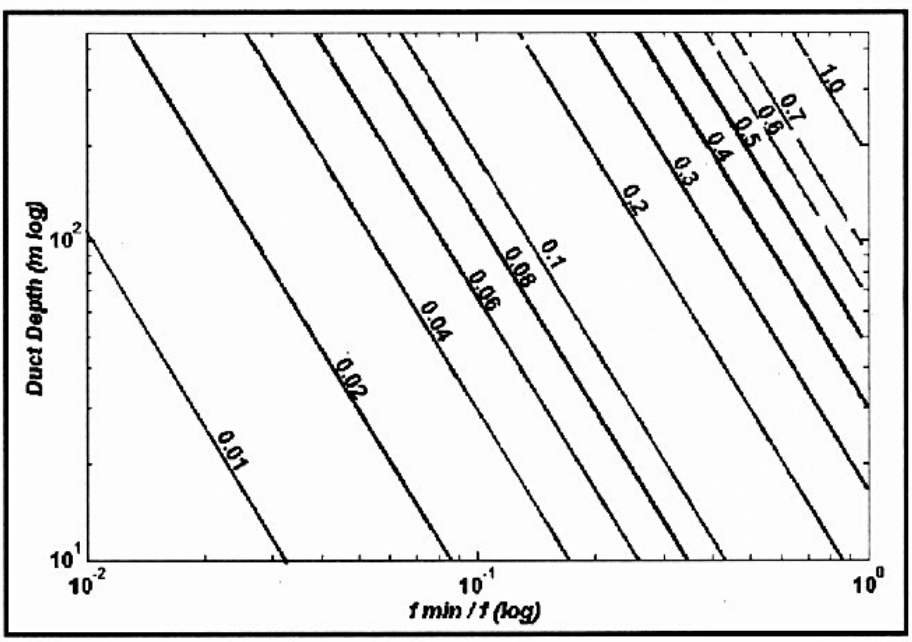


Figure 11. Duct entry angle (degrees) for a range of duct depths and f_{min}/f with dM/dh = 1.0. For other values of dM/dh multiply the above angles by sqrt(dM/dh). The data assumes that the duct is smooth. For a rough duct with 4 km long gravity waves [14] and a height variation of +/-2 m the minimum sustainable duct entry angle is about 0.1 degrees. The duct roughness has the effect of providing an upper frequency limit for a given duct strength.

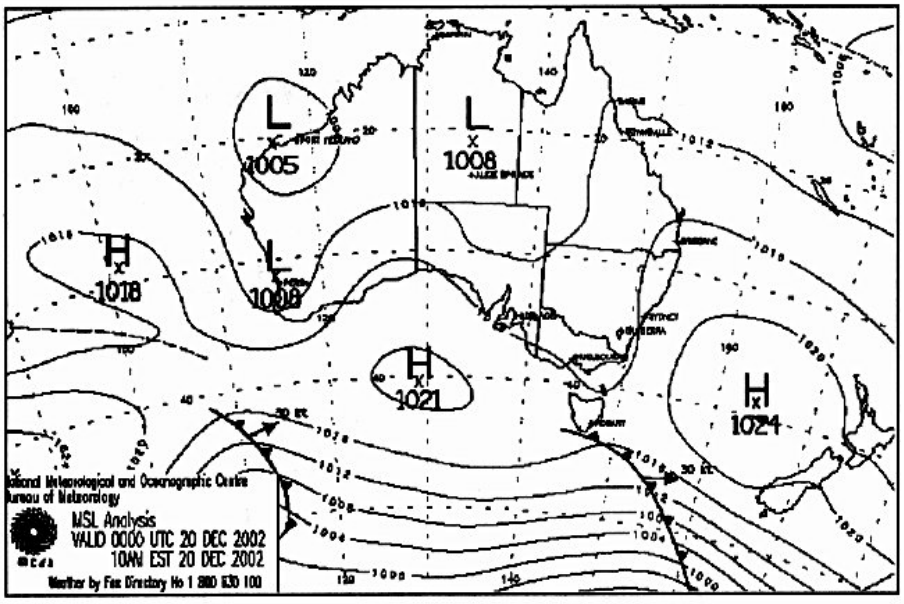


Figure 12. MSL analysis for a period of good VHF propagation from Esperance to Melbourne on 20 December 2002.

f is the frequency for which the angle of trapping to the duct is required and $f > f_{min}$ so that $\Phi_{tf} < \Phi_t$.

The duct entry angles given by Equation (5) over a range of duct depths and f_{min}/f and for $dM/dh = 1.0$ are shown in Figure 11.

To illustrate the effect of the combination of minimum wavelength and actual frequency consider that a strong duct with a 150 m depth has an approximate maximum wavelength from Figure 10 of 2 m (144 MHz). The corresponding duct trapping angle at 144 MHz from Figure 11 is around 0.8 degrees for a duct dM/dh of 1.0. For an operating frequency of 1.2 GHz (9 times or f_{min}/f of 0.11) the duct trapping angle is now about 0.1 degrees. This indicates that a station operating at 1.2 GHz has to be considerably closer to the duct than a station operating at 144 MHz in order to minimise the duct trapping loss. For a larger duct of 320 m depth and with the same dM/dh of 1.0, the maximum trapping wavelength is about 5 m or 60 MHz with a duct maximum entry angle of over 1 degree. The 1296 MHz station with f_{min}/f of 0.046 has a duct trapping angle of 0.06 degrees and needs to be close to or in the duct otherwise the duct trapping loss will be too high and preventing communication at 1296 MHz.

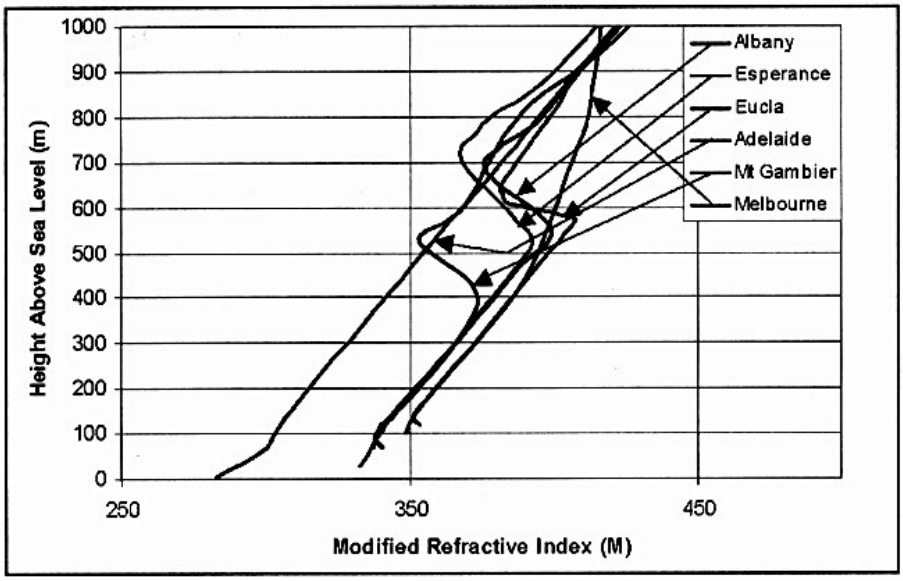


Figure 13. M profiles for the indicated stations for 00.00 UTC, 20 December 2002. This indicates the position of the elevated layer around the time of the good propagation conditions.

Entry to a duct at the lowest frequency that the duct can sustain is relatively easy as at this frequency the usable entry angle is largest. This seems to indicate that propagation at the lowest frequencies sustainable by the duct should produce long distance contacts. The reason why this is not possible is that the duct characteristics vary over the region where the duct is present so that the duct may support 60 MHz propagation only in the regions where the duct is weaker. In regions where the duct is stronger, only higher frequencies are supported so that long distance propagation at frequencies around 60 MHz is precluded.

As previously discussed, the surface of the duct has a wave-like structure. This surface roughness is probably due to internal gravity waves and wind shear induced instabilities in the stable boundary layer [14] that is associated with the inversion and distorts the duct surface by giving it a wave shape that is visible in the original photo used for Figure 1. This surface wave now causes the duct to have a continuously changing angle with respect to the horizontal so that a signal propagating along the duct is now required to adapt to this surface wave angle. If the angle of trapping to the duct at a particular frequency is smaller than the surface wave angle then the signal will not be trapped by the duct. The author developed the concept of surface wave angle Φ_{SR} which is approximated by:

$$\Phi_{SR} = a\sin(4xA_s/\lambda_s) \text{ degrees} \quad (6)$$

where:

A_S is the amplitude of the surface wave and

λ_S is the surface wave wavelength.

For a duct with a λ_S of 4 km and an A_S of 2 m the surface wave angle is about 0.1 degrees. For the previous example of a 1296 MHz signal with a trapping angle of 0.06 degrees, a shear roughness angle of 0.1 degrees would indicate that the 1296 MHz signal would not be able to be trapped by the duct. At 10 GHz it is even more critical to be in the duct or very close to it if duct propagation is to be contemplated because of the effects of the duct surface waves.

It is thus evident that higher frequencies will have higher duct trapping loss than

lower frequencies accounting in part for the observed frequency dependence assuming that the duct is smooth and follows a nice curve. If the surface of the duct is rough due to the effects of surface waves then the trapping angle will be larger for any given frequency. This effect will further reduce the upper frequency limit that the duct can transport. Smoother ducts transport higher frequencies than rougher ducts.

The equations above, plus the assumption that ducts have rough surfaces due to surface waves, gives a reasonable explanation of the observed frequency dependence for ducts with different strengths and also provides an explanation of the various duct entry and exit effects noted.

20 December 2002 analysis

On 20 December 2002 good propagation conditions were reported between Esperance and Melbourne [19]. The MSL analysis map for this day shows a large high-pressure system with a central pressure of 1021 positioned in the Great Australian Bight, Figure 12. This is a classic "good VHF propagation" situation [5].

To find out a little more about the nature of the duct that was present on 20 December the radiosonde soundings from Albany, Esperance, Eucla, Adelaide, Mt Gambier and Melbourne are analysed to provide M profiles for each of the stations and are shown in Figure 13.

The M profiles show an elevated duct at Albany, Esperance, Eucla and Mt Gambier. The top of the elevated duct is at a height of between 600 m and 700 m on the Western end of the path and at 500 m at Mt Gambier. There is evidence of a duct at Melbourne as the M profile is bent above 500 m. The time of the profile at 11.00 am local time in Melbourne means that there was probably sufficient surface heating to break up the duct structure on this day. The SODAR data from Figure 4 provides clear evidence for a duct being present earlier in the day on 20 December 2002 at 600 m. It is interesting to note that the top of the elevated duct in this high-pressure system is entirely between 500 m and 700 m providing further evidence that the height of the duct is similar over the whole high-pressure system. There is no evidence of the elevated duct drooping down to become a surface duct, see Figures 4, 5 and 13.

The profiles from the Western end of the path are taken at 00.00Z (08.00 local time) when the duct has not yet been disturbed by local heating. The profile from Adelaide shows no evidence of an elevated duct as the duct may have been disturbed by local surface heating. The temperature was 30 deg C in Adelaide at the time of the observation. The path taken by the VHF signals from Esperance to Melbourne passes south of Adelaide so that if a duct is not present at Adelaide it does not have any effect on this path.

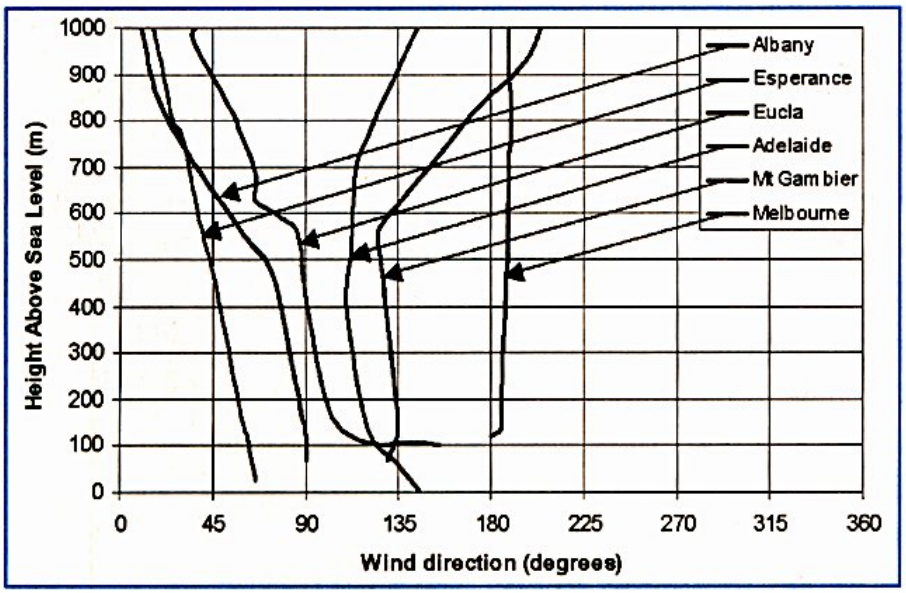


Figure 14. Wind direction for the indicated stations for 00.00 UTC, 20 December 2002.

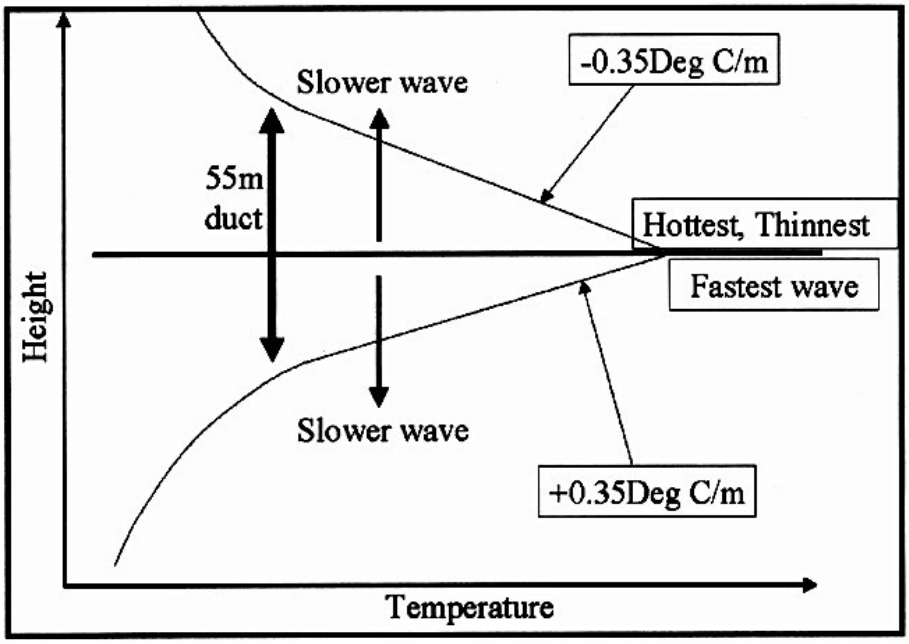


Figure 15. In the duct the upper and lower boundaries have a temperature gradient of 0.35 degrees C/m. At the hottest part of the duct the air is driest and thinnest and radio waves travel faster than in the cooler parts of the duct where the radio waves travel slower.

The wind direction for the same time of the *M* profiles is shown in Figure 14. The wind is approximately east on the western part of the path going more southerly further towards the eastern end of the path. Above about 500 m the wind goes more northerly at the western end of the path and more southerly at the eastern end of the path resulting in the wind shear associated with the elevated duct. These wind directions are entirely consistent with wind in a high-pressure system where the surface wind flow is anti-clockwise around the high-pressure system. It is this wind direction and the presence of elevated ducts that indicates that the high-pressure system causes the elevated ducts and that most likely no other meteorological effect is involved in the formation of elevated ducts. This discounts the requirement of sea breeze effects to form a duct over this path [5].

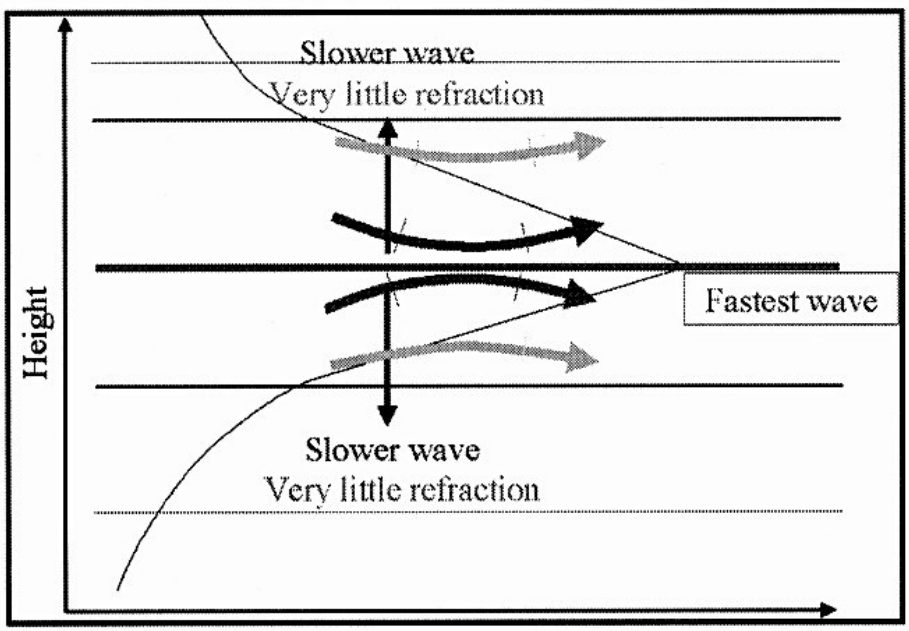


Figure 16. At the centre of the duct the wave front is bent more than further out in the duct resulting in a bending of the wave front.

Putting it all together

In order to understand how the observed effects and the theory come together the structure of the duct needs to be examined in some detail. The elevated ducts are of the most interest for long distance propagation and are discussed here.

The elevated duct structure is very complex. It has substantial temperature changes and associated changes in wind speed and direction (wind shear) Figures 4, 5, 6 and 7. This wind shear shown in Figure 7 is caused by the subsidence in high-pressure systems when the falling drier air encounters the cooler, denser more humid air below and results in a "balance point" and resulting wind shear. At this "balance point" the compression of the falling air causes an increase in temperature as the falling air is compressed against the more dense air below. The changes in temperature and humidity plots are readily evident in Figures 4, 5, 6, 7 and 8 at around 600 m. When the temperature increases with a corresponding decrease in humidity a duct is formed.

The mechanism by which radio waves are refracted in a duct is that the wave front travels faster in the less dense air found at the centre of the duct and slower in the cooler, more dense air further from the centre of the duct. The radio signal is thus refracted away from the centre of the duct as shown in Figures 15 and 16.

If the radio wave comes from above the duct, assuming that the duct is smooth, it can be refracted out again and not stay in the duct at all and sub-refraction occurs, Figure 16. If the radio wave is able to maintain exactly the right position and stay within the duct the wave is able to travel great distances by super-refraction, Figure 17. This is difficult to achieve as the duct will probably not have exactly the right refractivity gradient to achieve this.

It is more likely that when the radio wave enters the duct it will repeatedly enter and leave the duct by refraction along the lower side of the duct and by this means travel great distances. This concept of repeated refraction is able to explain long distance propagation via ducts with the variable refractivity gradients that are more evident in practice. The angles of refraction are of course very small as each refraction may be up to 50 km apart, Figure 18.

As the trapping angle of the signal to the duct increases the radio wave is less likely to be refracted enough to stay in the duct and it will reach the point where it will pass through the duct, Figure 19.

So far only a smooth duct has been discussed. Surface waves associated with the formation of the duct, Figures 7 and 8, cause the surface of the duct to be rough in a manner that the surface of the ocean is roughened by the wind across its surface. This roughness due to gravity waves can readily be seen on the top of elevated ducts, it has a wavelength of about 4 km (not electromagnetic wavelength).

These surface waves provide a lower limit to the duct trapping angle so that higher frequencies with smaller duct trapping angles cannot be propagated via the duct. For instance, a duct roughness length of 4 km and a variation of the duct vertical position of +/-2 m results in a duct roughness angle of about 0.1 degrees. This means that frequencies which require duct entry angles of less that 0.1 degrees cannot be sustained in the duct because the duct surface waves cause them to "spill out". This provides an upper limit to the frequencies that a particular duct can propagate. The only way that higher frequencies can be propagated via a duct is for the duct depth to decrease, for the duct gradient to increase and/or the duct roughness to decrease. This provides a reasonable explanation as to why weak ducts cannot propagate microwave signals and why frequencies of up to 10 GHz are only rarely propagated over long distances via a duct because the very strong ducts required occur only rarely.

The surface waves allow signals to enter and leave the duct more easily so that the duct is "leaky" along its entire length, Figure 20. As the turbulence scatters the radio signal, there will be an associated loss of the signal because of the multiple refractions from the rough duct surface.

The entry angle to the duct is a critical factor and is a reason why stations at higher elevations are able to use the duct over greater distances than stations at lower altitudes. As the ducts become more extreme the refractive gradients are higher and the entry and exit angles are consequently smaller. This is the reason that under some very good conditions stations towards the middle of the path

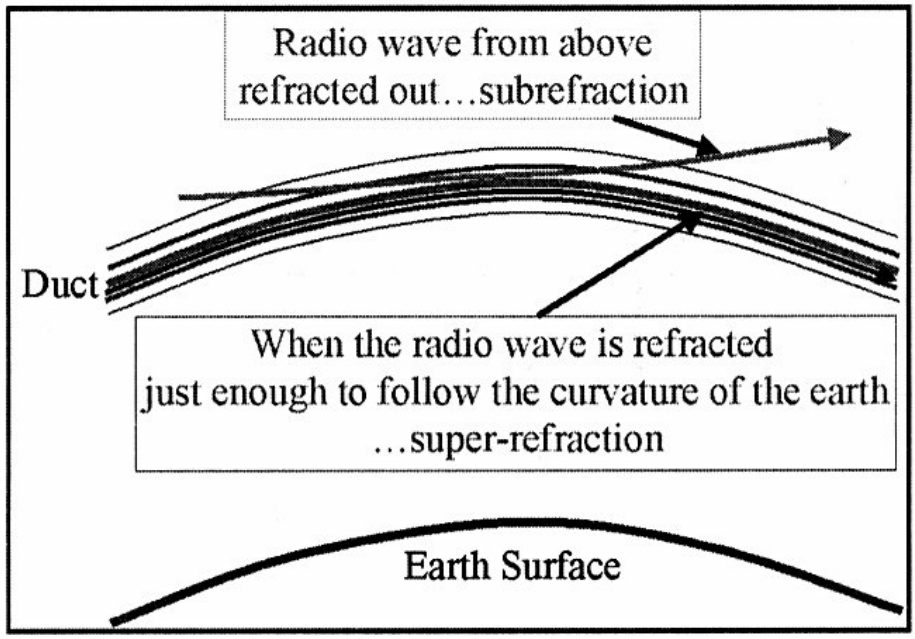


Figure 17. When the radio wave is refracted from above the duct the wave can be refracted out of the duct in a process known as sub-refraction. When the radio wave is in the duct it can be refracted just enough to stay within the duct so that super-refraction occurs and the radio wave travels over great distances if the temperature gradient is optimum. Slight changes in the temperature gradient would prevent the signal from maintaining its position in the duct.

where refractive gradients are higher, can be "passed over" and miss out on the DX altogether.

The concepts developed here are able to explain all of the effects noted earlier and provide a better understanding of the characteristics of elevated ducts and how VHF and microwave signals interact with them.

To return to the issues:

- The concept that ducts act as a wave guide is probably incorrect. The signals travel along the duct by multiple refraction from the surface roughness of the duct. The duct acts as a "boundary layer" by guiding the signals around the surface of the earth by multiple refraction from rough surfaces.
- The ducts are frequency dependent where the lower frequency limit is related to the duct strength and depth while the upper frequency limit is set by the duct roughness.

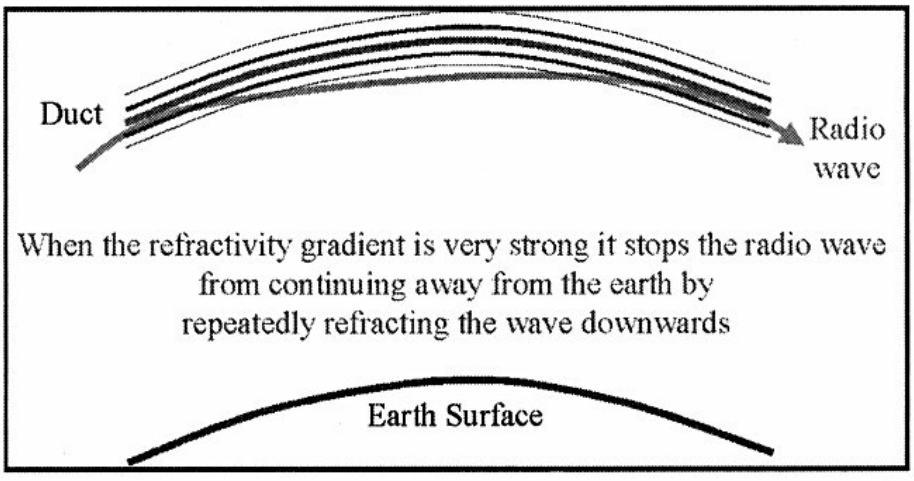


Figure 18. The radio wave does not stay exactly in the duct but is repeatedly refracted out only to re-enter at greater distances. This process more easily describes the observations and the ability of the duct to propagate many different frequencies depending on the duct temperature gradient.

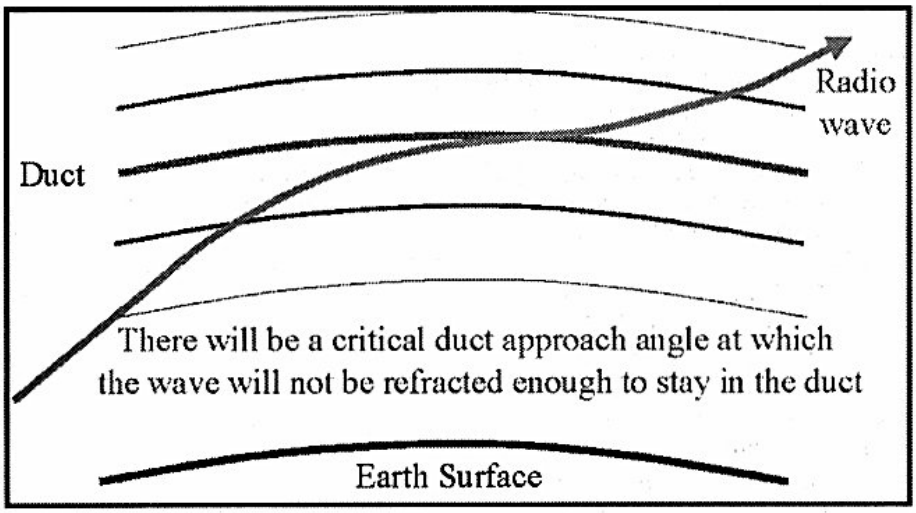


Figure 19. If the angle of the signal to the duct is larger than the duct trapping angle the signal passes through. This is a frequency dependent effect.

- It sometimes appears that coupling to the duct is only at the ends. Coupling towards the middle of the duct depends on the strength of the duct and the entry angle so for some stations well below the duct it may appear as if the coupling is only at the ends.
- It is not essential that the antenna is "in the duct" but clearly closer to the duct is better and is illustrated by the higher placed stations working more DX via ducts.
- Evaporative ducts only occur over water. Radiation cooling is the cause of ground ducts over land unless of course a lake is present in which case an evaporative duct also occurs.

Summary

From the results of many observations and the development of a better understanding of the characteristics of elevated ducts the following results and observations can be summarised:

- Elevated ducts remain elevated, they form and break up at a given height, the height of the 600 m elevated duct does not change with the evolution of the high-pressure systems.
- Surface ducts rise and break up during the day and fall in the evening to reform near the surface, they do not rise to sufficient height or remain strong enough to propagate VHF/UHF signals over long distances.
- The radiosonde provides a reasonable indication for predicting ducts but it is limited in resolution and often misses key structures. Radiosonde measurements are excellent when there is nothing else.
- Ducts act more like a boundary layer by repeatedly refracting VHF and UHF signals resulting in long distance propagation.
- The smaller the entry angle (closer) to the duct the better the coupling of signals into the duct.
- Characterizing the duct as a "wave guide" is probably incorrect given the evidence.
- The duct is frequency dependent, band pass, the low frequency cut-off being determined by the duct depth and strength while the high frequency cut-off is determined by the duct surface roughness.
- Surface evaporation ducts occur over water, surface radiation ducts occur over land.
- Stations at higher elevations are able to work more duct related DX than stations at lower elevations because of the reduced entry angle into the duct with higher elevations resulting in better signal levels from distant stations.
- High-pressure systems in the Great Australian Bight are probably the only mechanism required for elevated ducts to form, no other mechanisms are required.
- The duct in a high-pressure system is at approximately the same height over the whole high-pressure system.

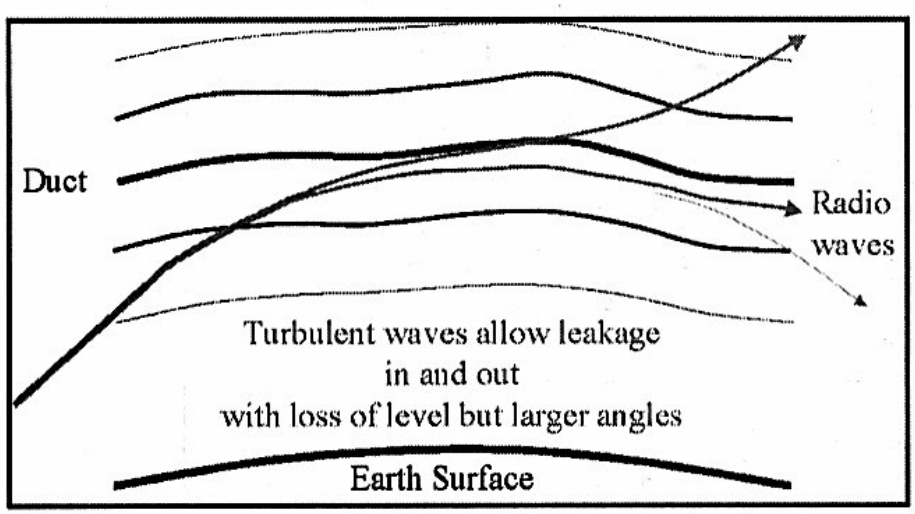


Figure 20. The duct surface is not smooth but rough allowing signals to enter and leave more easily, also resulting in an upper frequency limit for the duct.

Acknowledgment

Tele-IP Limited is acknowledged for providing data from its StratoSonde SODAR for use in this paper [9]. The many contributions from other amateurs by way of observations and just being there to make a contact are also acknowledged.

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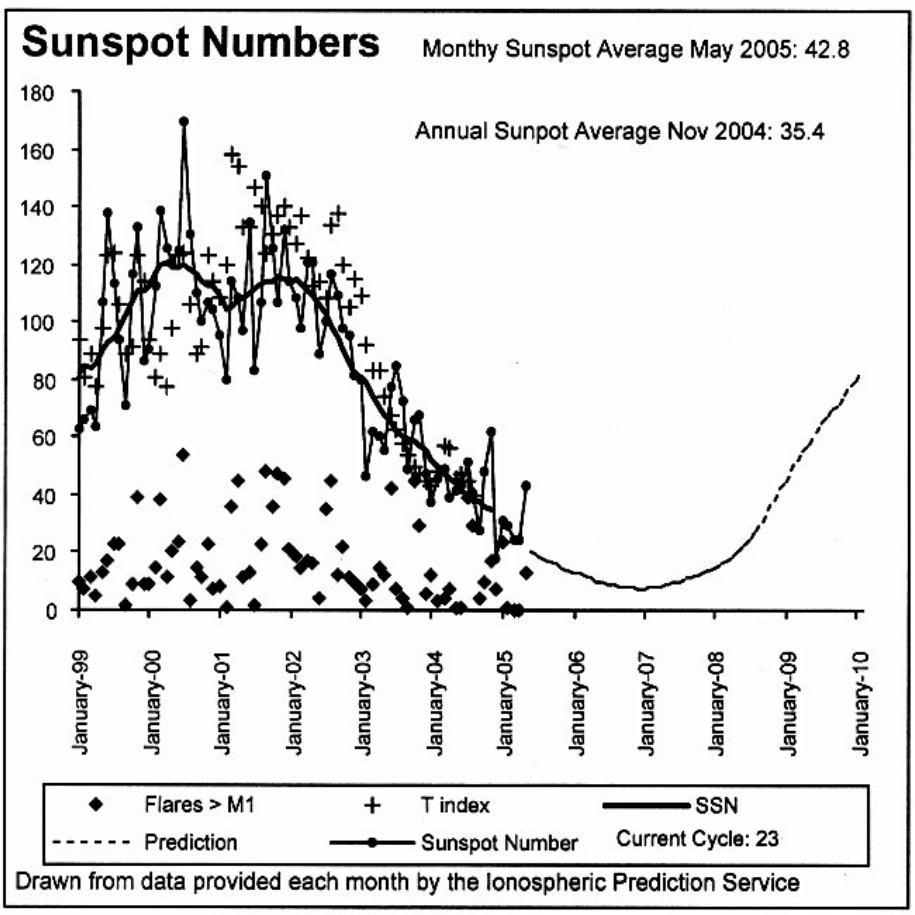

WIA news *continued*

power distribution system.

If the Motorola BPL system were used in Australia and New Zealand, unacceptably high levels of interference to HF users might still occur due to the increased length of line carrying the BPL signal into the home, and the likely necessity for higher injected power to enable the BPL signal to span that greater distance.

WIA President and Vice President attend the NZART Conference

WIA President Michael Owen, VK3KI and Vice President Ewan McLeod, VK4ERM attended the NZART annual Conference held in New Plymouth on the weekend of 4 and 5 June 2005.

Michael and Ewan were invited to attend the NZART council meetings before and following the traditional Queens birthday weekend conference.

In a speech at the Annual Dinner, Michael stressed the importance to the WIA of its relationship with NZART.

During the meetings it was agreed that NZART and the WIA would work more closely in relation to Standards and to explore the production of a joint reference CD.

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Women in radio

Christine Taylor VK5CTY

ALARA turns 30

On this, the thirtieth anniversary of the founding of Australian Ladies' Amateur Radio Association Inc. (ALARA), it is appropriate that we recognise two "women in radio" who represent two of the faces of ALARA. ALARA was founded in July 1975 by a group of VK3 YLs.

Myrna VK5YW

Myrna VK5YW was one of the first interstate members and conducted the first Nets held on HF.

The list of stations on those early nets is interesting because while there were some YLs with their own callsigns there were a number of others, as XYL of XXX, operating with their OMs in the shack with them. There were also quite a number of OMs who joined in without a YL present. The one thing that was obvious was that there was a lot of interest in the amateur community in this new "special interest" group.

Myrna got her licence in April 1975. She would love to have been assigned the callsign VK5YL (Young Lady) but was quite happy with VK5YW (Young Woman) instead. If she had passed her Morse sending exam at the first try she would probably have been given the 5YL callsign, instead it was Denise who became VK5YL

Denise had previously held the callsign VK1YL so was understandably given 5YL when she moved to VK5. There had been an earlier YL amateur, Betty, from Murray Bridge who held the VK5YL callsign from 1936 till the outbreak of WW2. Because she did not take up her radio interests after the War the callsign was available again.

An early picture of Myrna VK5YW operating as net controller for the first ALARA 80 metre nets

Myrna and her OM, Norman VK5NM had become interested in amateur radio after they had found their house was back to back to that of one of the government telegraph operators during their time in New Guinea. When they moved to South Australia Norman attended classes at the WIA. He got his licence in October 1965. Sometime after that Myrna went along to classes, too.

Myrna was the only YL in her class, an experience shared with many other YLs. The course started with 20 students but finished with only ten of whom Myrna was one. One particular memory of those classes that illustrates how things have changed was the smoking in class. Back in 1975 there was nothing unusual about most of the students, and often the teacher, smoking throughout a lesson. Unimaginable these days!

Myrna and Norman had built his first transmitter but bought a new Tentech rig for HF when Myrna got her licence. They mounted their aerial on a tower which still stands in the backyard though it has no aerial on it now. Both were dedicated CW operators from the beginning.

Unfortunately only thirteen months after Myrna got her licence Norman became a Silent Key. Myrna kept on operating on HF for several years but the pressure of being a working Mum with three children meant that there was little time for radio, so, rather than see the Tentech become valueless as it was replaced by more modern rigs, Myrna did sell it. She kept up her VHF, though, and well remembers one particular trip from Adelaide to Brisbane with the children, when she was directed almost all the way by local amateurs on 2-metres.

They made sure she turned the right way, and got onto the right road, as she drove along. There is nothing like local knowledge to keep you on the best roads, is there? Back in the 80's the roads through the middle of Australia were not nearly as good as they are today. You could very easily have found yourself in trouble without some local help.

Myrna VK5YW

As a country girl herself, she grew up in Salter Springs in the Mid-North of SA, where her father was a Soldier Settler; Myrna has always had an affinity with country people. She still has family in Salter Springs whom she visits regularly.

Myrna kept up her membership of ALARA even after she gave up operating. She has attended many of the Birthday Luncheons and now that she has at last retired from work, she looks forward keenly to the monthly lunches in Adelaide.

ALARA'S Birthday

Each year we celebrate our birthday on the 4th Saturday in July with a Birthday Net, from 1000 to 1200 UTC on 3.588 MHz ±
We welcome YLs, whether you are a member or not, to come on air and have a chat.

Maxie DL4YL

Within a year of the foundation of ALARA, early members were applying to sponsor their DX friends into ALARA. This was the beginning of our sponsorship arrangements. There is no obligation to sponsor anyone, but for some of us, it is the most interesting part of our membership. Sponsors exchange badges and other items that relate to the YL organisations in other countries. They send each other Christmas and birthday greetings and introduce them to their families. They become friends without necessarily ever meeting.

Maxie is one of the DX members of ALARA. However Maxie is different because she is also a regular visitor to Australia. Maxie and her sister, Marile (not an amateur) come here every three years or so. They have amateur and other friends in many places and plan their trips around seeing these people, while seeing much, much more. In fact they have probably seen more of Australia than most of us.

Maxie and her husband Heinie both passed their amateur licence exams in April 1958. Maxie did not ask for but was given the callsign DJ4YL and Heinie DJ4KU. They had become interested a couple of years earlier through Walter DJ2WS, becoming Short Wave Listeners first (for which there was an exam).

Heinie and Maxie had separate rigs. Heinie had a Heathkit DX 100 transmitter and a Geloso receiver, while Maxie used a BC 348 receiver and a handmade COPA for CW in her parents' house before they married. They both used CW exclusively until quite recently when Maxie joined her local club and bought a VHF handheld and started using phone. Heinie was probably the most frequent user of the amateur station but Maxie had a regular sked on Wednesdays and participated in contests from time to time

Heinie was a white stick operator as the result of an accident as a child. He was also a lawyer and eventually a judge. Maxie became his reader etc almost from the time they met as university students interested in music. Nevertheless, through amateur radio both of them made friends around the world through their hobby. On several occasions when these DX ham friends were travelling around Europe they stayed with Maxie and Heinie.

Heinie died very suddenly in 1986, which changed Maxie's life entirely. She still reads books for the blind and has become a proof-reader for a publishing house among the other interests of music and amateur radio.

Now, as Maxie and Marile come to Australia (which they love) they visit the VK amateurs. They stay with or near Syd now VK4STC but formerly a VK3 amateur, and in VK5, they stay in a granny flat at the home of Sheila, widow of Bill VK5VK, an arrangement that pleases everyone. It was Bill who first introduced Maxie to ALARA because he got in touch with me back in 1991 when he knew Maxie was coming to visit him and Sheila. ALARA invited them to one of our regular luncheons and it all went on from there.

Through ALARA they have met Dot VK2DB and her OM John VK2ZOI, and quite a number of the ALARA YLs in VK5 so Maxie and Marile plan their tours to include visits with them, too. A very enjoyable arrangement all round.

With Bill and Sheila they have spent some time on Kangaroo Island. With me and my OM Geoff they have stayed at our bush shack near Swan Reach, but on their own they have visited the Bungle Bungles, Katherine Gorge, most of the National Parks in New South Wales and Queensland to name just a few on and off the beaten track places

Maxie DJ4YL with her sister Marile with a friend at Cleland National Park

On their most recent trip they arrived in Adelaide from Melbourne via the Great Ocean Road. On that particular tour they were almost the only passengers so they probably saw more that usual - and loved it all. Then, before they left SA they spent a week camping on the Coorong. As I say they have seen much more of Australia than most Australians, all because of amateur radio. It is a great hobby, and a great way to make friends.

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News from...

VK4

QTC to live on

June 2005 is a very historic month indeed, as the last stand-alone issue of the journal of renown QTC has been published. QTC was first published in July 1927 following the inaugural meeting of The Queensland Radio Transmitters League (eventually to become the QAC). Leo J Feenaghty VK4LJ was the first Editor, Bruce VK4EHT the last. The objective of QTC was plainly spelt out in the first paragraph of the first issue: "With this issue of QTC the Queensland Radio Transmitters' League enters upon the second state of its activities, that of organised publicity and promulgation of reports of its doings and Plans for the future."

July 1980, Editor David Jones VK4NLV (now VK4OF) polled members about the content and future of QTC. Interest in QTC grew back and the magazine adapted to meet the needs of the Queensland membership. At the February meeting of the WIA-QAC the decision was made to discontinue the pamphlet production of QTC, QTC now to be part of the National WIA publication Amateur Radio with the unique masthead, which retains the heritage of QTC.

QSL Bureau calling

The current managers of the VK4 Inwards QSL Bureau, Shirley VK4HSG and David Gulley VK4DCG will step down by the end of this year. So if you have the calling to serve our Hobby in a most important way, contact the WIA-QAC or Shirley and David and ease yourself into the life as a QSL Manager.

The North Queensland Amateur Radio Convention 2005

That premier event on the worldwide Amateur Radio calendar is taking place again in 2005.

The North Queensland Amateur Radio Convention will be happening during the day at the Douglas Campus of James Cook University and during the night at Anita's Restaurant, Cluden Park Motor Inn from Friday September 16th to Sunday September 18th. For information pack and registration form either surf to http://www.vk4tub.org/tarc/convention.htm or request one from vk4wit@wia.org.au

A limited number of printed copies is also available from most Queensland radio clubs.

City of Brisbane Club

Just received some great news from Mick VK4NE. Seems his club's 6-metre repeater on 53.975 is up and running again after replacement of both its antennas. More details on this work will be disclosed at their June 14th meeting.

Brisbane VHF GROUP Repeaters

The Brisbane VHF Group owns and operates two significant Brisbane area repeaters, namely VK4RBN on 147.0 MHz at Mt Glorious and VK4RBC on 438.525 MHz on Mt Coot-tha. The Group would like to remind users of these repeaters that licensing and maintenance of them costs money on a recurring basis. Although obviously we can not ask for financial support "on air", support in a tangible way by repeater users is very welcome. Contact the Group Secretary Jason VK4YOL at 10 Geraldine Street, Wavell Heights, 4012, or go along to a meeting. VHF group says, "thanks in anticipation of your support!"

ATV SEQ-ATV Group

VK4RSS SSTV repeater is back on line after a long absence. Location is Ocean View north of Brisbane. It has an extensive coverage north to Caloundra and south of Brisbane so give it a try. Frequency is 438.575 MHz (negative offset). This repeater has SSTV priority with voice transmissions secondary. John VK4ET provides a replay of your pictures if desired. A 1750 Hz access tone is required. Replay operation time is approximately 0900 to 2000 hrs daily. In addition John VK4ET has established a HF SSTV repeater from his location at Brackenridge on 24.940 MHz USB. His antenna is a Delta loop at about 13 metres in height with a TX power output of 60 watts. A 1750 Hz tone is required for access. Repeater operation times are approximately 0900 to 2000 Hrs daily. Please give it a try. Reports are welcomed.

Bundaberg and Hervey Bay WICEN

The combined training day for Bundaberg and Hervey Bay WICEN groups was held several weeks ago, 15 attended and Acting S.E.S. Controller Richard Cooley welcomed the members and, for the Hervey Bay contingent, pointed out the vital role played by Bundaberg WICEN in providing all radio comms for Welfare.

Rusty VK4JM presented the program for the day which included: The role of WICEN; Message writing procedures; Standard operating procedures, forms to be used and the comms Diagram. Activation of Bundaberg WICEN. Practical operations including setting up a station. The debrief and close at about 1600 hrs completed a very successful day and Hervey Bay went home fired with enthusiasm and ready to set up a group at the Bay.

The last word

You have all heard the quotation "A database is accurate at one point in time" (or similar). Well, the QTAC one 'ain't' any different. So, would you all take a look at http://vk4radio.info and check out the listings of repeaters and beacons. There are lots of blank spaces in things like HASL (ie: Height), Time Out, and we even suspect that some repeaters and beacons may not be operational. So if you know the missing bits or know that any data needs to be amended, then please send an advice to QTAC at their address, which of course is qtac@wia.org.au

Your QTAC men - Andrew, Don, Len and Bill would love to hear from you.

VK7

Justin Giles-Clark, VK7TW
Email: vk7tw@wia.org.au Regional Web Site: reast.asn.au

More VK7 records set

On May 8, 2005 Joe, VK7JG worked Johan, ON4IQ on 6 m EME using the mode JT65A. Joe believes this is the first ever VK7 6 m EME contact and may also be an Australian 6 m EME record at a distance of 17,023.9 km. Joe commented "that all this has been made possible with Rex VK7MO providing the enthusiasm and encouragement and Joe Taylor, K1JT's WSJT programme."

BPL in VK7 – Aurora Energy's 2nd trial

By the time you read this, the BPL trial would have begun. July 4 was the official start date and what appears to be the infrastructure for the BPL rollout is appearing on power poles around Hobart. A mobile field strength team has been assembled and is ready for field measurements. A VK7 BPL Watch web page has been established on the Regional website and is regularly updated as information comes to hand.

Congratulation to VK7MO

Rex, VK7MO scoops the pool in the Ross Hull Memorial VHF-UHF Contest 2004-2005! The new digital section of this revised contest was convincingly won by our very own Rex, VK7MO. This is an excellent result, congratulations Rex.

YL Voice Net

Early Sunday mornings has seen Shirley, VK7HSC involved in a regular YL Net using IRLP. 0700 local time and the net can be found on IRLP reflector 9258. This net's early time allows contacts to be made worldwide and the net controller is John, KC8FCW. This has been arranged through the packet YL group. OMs are welcome too!

Did you miss that VK7 Regional Broadcast?

No worries – it is also available via e-mail mailing list and on the Internet. The easiest way to subscribe is click on the link on the front page of the regional website. The e-mail and Internet versions of the Regional news also gives you all those Internet and e-mail addresses that are not read out when it goes to air. If your e-mail mailbox is already overflowing then you can read the broadcast online at the regional website and head to the VK7 Regional News page.

Central Highlands Amateur Radio Club of Tasmania

A quick reminder to put the Wadda Cup contest in your diary – 24th September 2005.

The club is holding its winter getaway weekend at the Liawenee (please note change of location). The weekend is set to start on Friday July 22nd until Sunday July 24th. Comfortable accommodation is available. BYO is the go. If you need accommodation, you must confirm a booking with David, VK7KDO on 6273 0642. We hope to see you there.

North West Tasmania Amateur Radio Interest Group

NWTARIG Membership Certificates are now available, and members are asked to make arrangements for collection by contacting Tony VK7AX on 6425 2923. Activity on SSTV is increasing in the NorthWest area using 2 m on VK7RMD and the SSTV Internet gateway of VK7AX. Experimentation also includes digital SSTV. 'Spectrum Extra' is now being aired Thursday nights at 19:30 on Northern repeaters with many interesting segments being broadcast.

Northern Tasmanian Amateur Radio Club

The June 8th meeting saw Norm, VK7AC update the club on the BPL trial. Allan, VK7AN and Kevin, VK7KVN then gave excellent talks the G5RV versus the Carolina Windom, a good night's entertainment. A reminder that the Mt Arthur repeater (VK7RAB) is a solar powered and less sun = less charge to the batteries. For cross-town contacts please use VK7RAA.

Radio and Electronics Association of Southern Tasmania Inc.

We welcome Damien, VK7HDS to the amateur airwaves. Damien is one of our HF CB rebroadcasters and got his amateur ticket recently. VK7RAD repeater now has a 2 m output back and operating on 147.975MHz. This repeats all it hears from 70 cm and 6 m. VK7RBW has also been repaired and updated and now requires a 123 Hz CTCSS tone to access. By the time you read this, the REAST WICEN group will be doing last minute preparation for the VK7 leg of the Subaru Safari 2005 on 9 & 10 July. Good luck.

On June 1st, Graham Lill, VK7ZGL who is a traffic engineer gave a fascinating talk on traffic management and engineering in and around Hobart including the Tasman Bridge and Cat's Eye corner on the Southern Outlet. Thanks Graham.

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Silent Keys

Don Brooks, Ex VK7DB.

Don will be remembered in Ham radio circles, together with the late Peter Frith VK7PF, as being instrumental in achieving the first VHF contact between Mt Barrow and Mt Wellington in 1954, a significant and historical event.

Don was an active amateur up till the last ten years or so when failing health confined his activities to his home and immediate family.

Vale Don.

Alex Szopko VK7CS

Alex obtained his Amateur Operator's Certificate of Proficiency in 1970 with the callsign VK7CS. Alex then obtained his Telecommunications Technicians Part-1 certificate from the City and Guilds of London Institute in 1971. Alex was also a member of the Australian Institute of Science Technology. Alex retired in 1990 and continued his passion with electronics, radio, and computers until the end.

Vale Alex

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ALARA

Christine Taylor VK5CTY

The Contest is coming!

Next month is a busy one. In the middle we have the Remembrance Day Contest and at the end we have the ALARA Contest. Please don't forget either of them. In the Remembrance Day Contest we recognise those who went to war on our behalf and in the ALARA Contest we celebrate the women amateurs who make up a small but important proportion of the amateur world.

To make sure we have plenty of time to chat the ALARA Contest runs for 36 hour and includes two sessions on 80 metres. This band is the one which best allows amateurs within Australia to talk to each other, and the evenings are the best times for this frequency. However, do not ignore the other bands and times. Make sure you call often and try to make contact with YLs in other parts of the world.

Don't forget that CW contacts on any band can be scored toward the Florence McKenzie Trophy. It is time we have another winner. Why not give it a try? In case you are not sure why only CW contacts score toward this award, it is because, during WW2 Florence VK2FD taught over 30, 000 men and women, to be CW operators. She was instrumental in persuading the government to enlist women as telegraphists, which released more men for other duties. She was also the very first VK YL amateur.

OMs please join in our Contest and give us some points. Unfortunately you can only get points toward the Contest when you make a contact with a YL but it can be made with a YL anywhere in the world.

We welcome the logs from OMs and need all the logs from the YLs participating. We always hear more stations than we receive logs so why not make it different this year? The Contest Manager is again Marilyn VK3DMS QTHR the callbook and at gsyme@wia.org.au

The ALARA Award

If you have participated in the ALARA Contest you may have made enough of the right combination of contacts to be eligible for the very elegant ALARA Award. You need ten contacts with ALARA members, which must include contacts with five different VK states.

All bands and all modes are acceptable. Applications to Jean Shaw through the QTH of her OM VK3YL.

If you need those extra states to qualify at a time when the ALARA Contest is not on, why not call in toward the end of one of the Monday night Nets. If you say you want contacts for the ALARA Award we will gladly stay on after the Net to give you the legal connect.

The ALARAMeet

Have you booked your caravan site or cabin or room yet? The time till we all meet in Mildura is getting shorter. If you have been to an ALARAMeet before, you know you will have fun whether you are a YL or an OM. If you haven't been to one yet, maybe this is the year.

We have a number coming from New Zealand and a few from other DX places. Some of them are 'old hands' some are going to be at their first gathering. All will be welcome.

If you are a local Mildura amateur, YL or OM, please get in touch with Marilyn VK3DMS and come along to our Dinner on the Saturday or participate in some of the other outings and activities. We are usually lucky enough to have few locals along, wherever we go. There is nothing like local knowledge to tell us visitors what else there is to see, round about, in case we can stay for longer than just the weekend of the ALARAMeet.

Please come along and help us celebrate the 30 years since those first YLs decided they should form themselves into their own organisation within the WIA and the amateur world.

The ALARA Sponsorship Scheme

Almost as soon as ALARA was formed in 1975 the members decided to do as other YL organisations were doing, to have sponsored members from overseas. The idea is that when you make DX friends you can sponsor them into ALARA. Most often they make you members of their home group, too, but there is no requirement to do so.

There is no requirement on our members to sponsor anyone, though many do so.

Most YL organisations have regular newsletters through which they keep in touch with what others are doing. Quite a number of people send notes to the editors every so often so we also keep in touch with what they are doing. It is always interesting to read about the activities happening in other parts of the world.

We usually exchange letters at Christmas and birthdays if we know when they are, and now in these days of emails we often exchange little items of interest we come across. Some sponsors both in Australia and overseas are good correspondents and some are not - but that is the same for us all with our friends and families, isn't it?

ALARA has a Sponsorship Secretary who arranges sponsors for anyone wanting them. She also announces every now and then that she has been asked for a VK sponsor for someone overseas. She rarely has to wait long before a member offers to take on the new person.

As ALARA members we pay a membership fee for our sponsored members and if they have a reciprocal arrangement they pay for us to be members of their group. The cost of the memberships only cover the cost of the magazines so it is not expensive. It certainly is worthwhile.

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DX - news & views

John Bazley VK4OQ,
P.O. Box 7665,
Toowoomba Mail Centre, QLD 4352.
E-Mail --- john.bazley@bigpond.com

When I wrote in May – 'that there is no doubt that DX appears to be alive and well in Australia' I had no idea that Mal – VK6LC would be announcing the new W.I.A. 3 & 5 Band DXCC awards – great news. It will be interesting to see how many people apply for them.

CQ Magazine announced in March the revival of a yearly DX award ' The Annual DX Marathon.' which was last run by CQ in 1948. The revived CQ DX Marathon will be essentially a year-long DX contest, with stations competing to contact as many different countries ("entities") and CQ Zones of the World as possible over a full-year period, then starting again at zero at the beginning of the next year. The programme was outlined for the first time at the International DX Convention in Visalia, California on April 16th last. Scoring will be very simple, consisting of the total number of DX entities and CQ zones contacted over the course of a year. There will be no multipliers and each country and zone will count only once. In the case of a tie, the station whose last qualifying contact came earliest in the year will be the winner.

Complete details and rules will be posted on the CQ website (www.cq-amateur-radio.com) after the May issue of CQ magazine is in subscribers' hands. The first event will commence in 2006.

So how have you found conditions on the LF & HF bands during the past few weeks? As the sunspots continue to decline it is interesting to see the increased activity that has taken place on 10.1 MHz. There have been some really good openings on that band particularly as more amateurs are realising its potential. There are now far more rotary beams and phased arrays being used than 12 months ago which I imagine accounts for some really outstanding DX signals 'popping up' on an apparently dead band!

Now to DX News!

VU4 Card Clarification NC1L

Bill Moore, DXCC Manager.

We are accepting VU4RBI/VU4NRO QSO cards. A few cards have been rejected on the basis of incomplete information on the cards.

If you received a QSL card complete with all data (time, date, band, mode and callsign), there is no problem. If you have a QSL card with less than complete data (callsign only, missing time/date, etc.) we will need to see the card at HQ. This is usual procedure. Blank cards and cards missing information are always subject to inspection at HQ. Do not add the missing information. As always we strive to maintain the highest integrity possible in the DXCC program.

Taking just two – at random – of the DX operations last month.

Did you catch the recent short operation from Market Reef OJ0VR by OH1VR, Seppo? In 19 hours they made some 850 QSOs with 100 watts and a Windom. He reports this was his last trip to OJ0. Seppo goes on to report he has plans - starting in mid October to travel around the world in 60 days in celebration of his 60th birthday. He expects to start on October 17th and spend 10 days on each of the six continents. Final plans will be announced in August. We could have some 'interesting DX spots' - QRX as this one continues to develop. Or Hans A25/DL7CM and A25/DM2AYO who were active on all bands.

Since the last edition of DX News & Views there have been several operations from Pacific Islands and of course the WPX Contest. The latter produced some great opportunities to work some of the more rare spots activated specifically for the Contest. Hope that you managed to work some 'wanted' countries or specific bands .

What have we got to look forward to ?

The next DXpedition which I am sure will be of interest to many VKs is the planned trip to Kure KH7C from September 24th to 8th October. Four stations will be active. Operators will be KK6EK, NI6T, N6MZ, N0AX, N7CQQ, W6KK, DJ9ZB, I8NHJ, K6SRZ, K6DZL.

From 26th July to 5th August (three days longer than originally intended) W8GEX, K8LEE and W9IXX plan to activate Sable Island CY0AA on 160 to 6 metres CW,SSB,RTTY and PSK. QSL to K8LEE. Logs will be on line and updated daily --- http://www.wb8xx.com/sable .

More information is now available on the planned trip to East Kiribati T32 that I mentioned last month. It is planned to operate from two new IOTA islands – the first will be Flint Island and if they are unable to land there they will try to do so on Vostok Island. The other will be Millenium Island. The operators will be IT9YRE, I1SNW and IT9EJW.

F5CW reports that the expedition to Glorioso Islands FR/G has been postponed. Apparently the French military authorities discouraged the team from landing in late May for security reasons. Further updates will be posted to http://glorieuses2005.free.fr/: Dany said "we are a bit upset with this situation but we never give up".

VK9XD Christmas Island. David-VK2CZ plans to operate from there 25th October to 6th November taking in CQWW SSB Contest as SO/AB. QSL via VK6NE (vk6ne@upanaway.com) [Neil Penfold, 2 Moss Court, Kingsley – WA 6026, Australia].

VK9XG Christmas Island. Charlie-W0YG will also be there the same times as David. QSL to his home call.

SV9/F8UFT Crete Claude-HB9CRX will be active from the 17th July until 31st July 40-10m, CW, QSL via F6ICG or vis the bureau .

3V8SM Tunisia operating from 26th July until 31st July including the IOTA Contest using 80-10m, SSB, RTTY and

continued on page 37

Beyond our shores

David A. Pilley VK2AYD
davpil@midcoast.com.au

Malaysia:

HF privileges granted new hams

Some good news for hams in Malaysia who have been waiting all their lives to receive High Frequency operating privileges. 9W2JAR reports that this dream has finally come true for some of them.

Jaja says over qrz.com that a total of 19 "B licence" hams passed the Morse Test held at the Malaysian Communications and Multimedia Commission headquarters from March 29th to the 31st. They were granted the 9M2 prefix callsign as new Malaysian ham radio ambassadors.

This was the first time the Malaysian Communications and Multimedia Commission has organised the Morse Test since it took over the management of Amateur Radio hobby from Department of Telecommunication a few years ago. The last time a Morse Test was held was in the year 1997. (9W2JAR)

(ARNewsline)

Vatican:

Ham radio dying in the Vatican

Ham radio could soon be a thing of the past in the Vatican. This is because there are no longer any H-V prefix stations to man the controls. Amateur Radio Newsline's Mark Abramovich, NT3V, was in Rome covering the selection of the Catholic Church's new pontiff when he discovered that ham radio operations from all three Vatican stations may soon be QRT for good.

Mark spoke with Monsignor Lombardi who handles communications for the Vatican TV and Radio about the Vatican's ham stations and was shocked to learn that they had all fallen silent. That's right, he says HV1CN, assigned to Vatican Radio, as well as HV5PUL, operated out of the Pontifical Lateran University, and HV3SJ, held by the Jesuit house in the Vatican City, were all inactive.

If Vatican ham radio is to survive, it looks like it will take an experienced DXer with some good diplomatic skills to get in touch with the Vatican or the North American College to offer an assist in keeping it alive.

(ARNewsline ™)

U.S.A.

Law enforcement

In May bail was set at a quarter of a million dollars (US$250,000) for a former Radio amateur who was arrested on May 5th and charged with interfering with various radio services. The judge who set bail said the bond would have to be fully secured. This means that he must put up cash or property in the amount of US$250,000 to secure his release from custody. The arrest followed alleged jamming of radio frequencies being used by the United States military, the United States Coast Guard, law enforcement and public safety agencies including those used by ham radio operators. Assuming that the person is able to make bail, a spokesman in the US Attorney's office said the person would be subject to home detention and barred from possessing any radio equipment. The person might also be fitted with a tracking device like that worn by millionaire business woman Martha Stewart since her release from jail. And like others under government watch, the residence would remain subject to search at just about any time.

(ARNewsline)

Sweden:

Deregulates amateur radio

Sweden's telecommunication regulatory agency PTS has taken steps to deregulate Amateur Radio and essentially no longer requires a government licence. Effective last fall, the PTS turned over Amateur Radio operator "certification" to the Society of Swedish Radio Amateurs (SSA), that country's IARU member-society. Under the new regulatory regime, the SSA administers testing and issues operator certificates and call signs, which have SA prefixes and three-letter suffixes. There's no longer a Morse code requirement for HF access.

The PTS still handles relevant international agreements, such as band allocations, in conjunction with the ITU. Sweden no longer dictates mode-specific sub-bands within amateur bands, but band plans are in place.

The new call signs can be issued by both the SSA and the PTS, but the SSA option reportedly is less expensive. All previously issued Swedish call signs are valid for life. Foreign visitors from countries outside the CEPT agreement must still apply to the PTS for temporary operating authority in Sweden.

(ARRL News)

Kenya:

More bands available

Kenya's telecommunications regulator, the CCK, recently issued a new schedule of Amateur Radio frequencies, modes and power limits. Ted Alleyne, 5Z4NU, of the Amateur Radio Society of Kenya reports that radio amateurs there now may use 30 meters (10.100 to 10.150 MHz) and 160 meters (1.810 to 1.850 MHz).

(ARRL News)

Thailand:

New bands for contests

The National Telecommunications Commission of Thailand has granted permission through 2005 for all Thai radio amateurs to use 80 and 160 meters during contest periods. HS- and E2-stations may use 1.800-1.825 MHz and 3.500-3.540 MHz, CW or SSB, during contest weekends.

(ARRL News)

Czech Republic:

New regs in force

Starting May 1 in the Czech Republic, new regulations provide access to 7.100 to 7.200 MHz for Amateur Radio on a secondary basis. Power output is limited to 250 W PEP. The Czech Republic also has begun issuing Novice class licences with OK9-prefix call signs and three-letter suffixes. Operation is permitted on 160, 80, 15 and 10 meters on HF, and up to 2 meters on VHF, at a maximum power output of 10 W.

(ARRL News)

continued on page 37

Bill Magnusson VK3JT

Hamsat a great success

After some weeks away from home, during which time HAMSAT was commissioned and renamed VO-52, I finally had an opportunity to fire up the gear and have a listen on Jun-5.

It was good to hear so many stations on the satellite. I heard calls from VK2-3-4-6-8 and ZL in just one pass. During the latter part of the pass I heard a noteworthy contact between VK6 and ZL, a very good effort since the satellite would have only been two or three degrees in elevation at both ends of the QSO.

Signals were excellent with little or no QSB. When VO-52 was high in the sky even one watt into the beams was enough for a strong downlink signal. VO-52 is a low earth orbiter. It carries a linear transponder. As with any other satellite supporting SSB or CW modes and in a similar low orbit, the rapid rate of Doppler variation can be a problem near the middle of overhead passes. It can be quite a challenge to keep your signal from drifting away from the starting frequency.

Mode-A was a piece of cake but once 70 cm or higher comes into the picture; it's not so easy. There has been much written on this subject over the years and opinions differ as to the best method of coping with the effect. Many operators adhere to the idea of leaving the receive frequency fixed and tuning their transmit frequency to keep the SSB resolved in the receiver.

Others like to tune the higher of the two frequencies as their preferred method. In the case of mode U/V, ie. the old mode-B, the transmit frequency IS the higher of the two so there's no argument between devotees of the two systems.

However, neither of these methods is completely successful in keeping a QSO on the same frequency for any length of time and will not absolutely guarantee not running into another QSO at some time. Only a completely computer controlled system of tuning can hope to do that.

Some people have been experimenting in this field and claims are being made that their systems are more or less successful. The jury is still out though and most who have tried the methods still report that the software and indeed the radios are not yet completely up to the task. This is an area where more development is likely to take place and - who knows - a successful method may be just around the corner.

By contrast, complete Doppler control for FM has been around for many years now and is totally adequate for voice or digital work even at microwave frequencies but SSB is another story.

Have a go at VO-52. It doesn't require highly directional antennas with auto-track. The power requirements are modest. Have a listen. You may be moved to try for a return signal. Then you can see if you are up to the challenge of fast moving Doppler. Good luck!

The AMSAT group in Australia

The National Co-ordinator of AMSAT-VK is Graham Ratcliff VK5AGR. No formal application is necessary for membership and no membership fees apply. Graham maintains an e-mail mailing list for breaking news and such things as software releases. Contact Graham if you wish to be placed on the mailing list.

AMSAT-Australia Echolink Net

The net meets formally on the second Sunday of each month. Anyone with an interest in Amateur Radio Satellites is welcome to join in and take part. Graham VK5AGR acts as net controller. The net starts at 0600UTC and you can join in by connecting to the AMSAT conference server.

All communication regarding AMSAT-Australia matters can be addressed to:

AMSAT-VK,
9 Homer Rd,
Clarence Park, SA. 5034

Graham's e-mail address is:
vk5agr@amsat.org

Half-yearly update of operational satellites

We'll give pride-of-place this time to the newly launched Indian HAMSAT,

VO-52

Launch Date: May 05,2005

Status: operational with Indian transponder.

Current Mode: U/V

Indian transponder:

Uplink : 435.225 MHz to 435.275 MHz LSB/CW

Downlink: 145.875 MHz to 145.925 MHz USB/CW

Beacon : 145.940 MHz continuous carrier signal

Dutch transponder:

Uplink : 435.225 MHz to 435.275 MHz LSB/CW

Downlink: 145.875 MHz to 145.925 MHz USB/CW

Beacon : 145.860 MHz 12 WPM with CW message

AO-51 ECHO

Catalogue number: 28375

Launch date: June 29, 2004

Status: Testing

Current Mode: PBBS and FM REPEATER – ON

Analog voice downlink: 435.300 MHz FM

Analog voice uplink: 145.920 MHz FM 67Hz PL tone

1268.700 MHz FM 67Hz PL tone

Digital Downlinks: 435.150 MHz FM, 38k4, 1 watt output

2401.200 MHz FM 38k4 bps

Digital Uplink: 145.860 MHz FM, 9k6 Digital

Broadcast: PECHO-11

BBS: PECHO-12

International Space Station (ISS) – ARISS

Status: Packet radio operational, occasional voice.

Worldwide packet uplink: 145.990 MHz FM

Region 1 voice uplink: 145.200 MHz FM

Region 2/3 voice uplink: 144.490 MHz FM

Worldwide downlink: 145.800 MHz FM

Repeater Uplink: 437.800 MHz FM

Repeater Downlink: 145.800 MHz FM

Russian callsigns RS0ISS, RZ3DZR

USA callsign NA1SS

Packet station mailbox callsign RS0ISS-11

Packet station keyboard callsign RS0ISS-3

Digipeater callsign ARISS

You will need to work out the most likely times to find someone at the microphone. The ISS daily crew schedule can be found at the following web site: http://spaceflight.nasa.gov/station/timelines/

Remember that the crew operates on UTC time. Since the Space Shuttle problems the crew work load has been very heavy and voice transmissions have been limited almost entirely to scheduled school contacts.

AO-7 AMSAT OSCAR 7

Catalogue number: 07530

Launch Date: November 15, 1974

Status: Semi-operational in sunlight.

Return to active status: June 21,2002

Uplink: 145.850 to 145.950 MHz CW/USB Mode A

432.125 to 432.175 MHz CW/LSB Mode B

Downlink: 29.400 to 29.500 MHz CW/USB Mode A

145.975 to 145.925 MHz CW/USB Mode B

Beacon: 29.502 MHz, 145.972 MHz, 435.1 MHz, 2304.1 MHz

FO-29 JAS-2

Catalogue number: 24278

Launch Date: August 17, 1996

Status: Operational

Voice/CW Mode JA

Uplink: 145.90 to 146.00 MHz CW/LSB

Downlink: 435.80 to 435.90 MHz CW/USB

Beacon: 435.795 MHz

Digital Mode JD

Uplink: 145.850 145.870 145.910 MHz FM

Downlink: 435.910 MHz 1200-baud BPSK or 9600-baud FSK

Callsign: 8J1JCS

Digitalker: 435.910 MHz

SO-50 SAUDISAT-1C

Catalogue number: 27607

Launched: December 20, 2002

Status: Operational.

Uplink: 145.850 MHz (67.0 Hz PL tone)

Downlink: 436.795 MHz (possibly 5kHz high)

To switch the transmitter on, you need to send a CTCSS tone of 74.4 Hz.

The order of operation is thus: (allow for Doppler as necessary)

1) Transmit on 145.850 MHz with a tone of 74.4 Hz to arm
2) the 10 minute timer on board the spacecraft.
3) Now transmit on 145.850 MHz (FM Voice) using 67.0 Hz to PT
4) the repeater on and off within the 10 minute window.
5) Sending the 74.4 tone again within the 10 minute window will reset the 10 minute timer.

UO-11 OSCAR-11

Catalogue number: 14781

Launched: March 1, 1984

Status: Silent, may be out of service.

Downlink: 145.826 MHz FM (1200-baud AFSK)

Mode-S Beacon: 2401.500 MHz

Nothing has been heard from this satellite since 2005-05-01

More information on UO-11 OSCAR-11 can be found at: http://www.users.zetnet.co.uk/clivew/

AO-16 PACSAT

Catalogue number: 20439

Launch Date: January 22, 1990

Status: Semi-operational, the digipeater command is on and open for APRS users.

Uplink: 145.90 145.92 145.94 145.96 MHz FM (using 1200-baud Manchester FSK)

Downlink: 437.026 MHz SSB (1200-baud PSK)

Mode-S Beacon: 2401.1428 MHz

Broadcast Callsign: PACSAT-11

BBS: PACSAT-12

GO-32 TECHSAT-1B

Catalogue number: 25397

Launch Date: July 10, 1998

Status: Operational but signal weak and subject to deep fading

Downlink: 435.225 MHz FM (9600-baud FSK)

Uplinks: 145.850, 145.890, 145.930 FM 1269.700, 1269.800, 1269.900 FM

Broadcast Callsign: 4XTECH-11

BBS Callsign: 4XTECH-12

NO-44 PCSAT

Catalogue number: 26931

Launch Date: September 30, 2001

Status: Operational but has passed its use-by date. If you intend to give this bird a go, familiarise yourself with the latest situation by visiting the AMSAT-NA web site.

Uplink/downlink: 145.827 MHz 1200 baud AX.25 AFSK via W3ADO-1

Aux/Uplink: 435.250 MHz 9600 baud via PCSAT-2 (off)

APRS Downlink: 144.390 MHz (Region 2)

Below is a list of the amateur radio satellites, which are in orbit but are not operational over VK-ZL at this time.

The list is included because a number (eg. AO-10) are possibly experiencing temporary failure due to battery problems when in eclipse. In addition, the remarkable experience with AO-7 may inspire you to keep a listening watch on the downlink frequencies of these birds in the hope of hearing something. Who knows? You may be the first to report an old satellite springing into life again. A full listing of frequencies is available via the AMSAT-NA web site and the keplerian elements are all listed on SpaceTrack.

AO-10	AO-27 is not switched on in the southern hemisphere
AO-40	AO-49
FO-20	IO-26
KO-23	KO-25
LO-19	MO-46
NO-45	POSAT-1
PO-34	RS-12
RS-13	RS-15
SO-33	SO-35
SO-41	SO-42
UO-14	UO-22
UO-36	And now possibly UO-11.

The above information is as usual gleaned from the AMSAT-NA News Service which is available to all by way of the AMSAT-NA web-site, www.amsat.org.

Goodies on the drawing board

PCSAT2

Will be carried to ISS on the return to service of the Space Shuttle. It will be fixed to the outside of ISS during a space-walk. PCSAT2 will use the same dual redundant AX.25 command and control system as used on PCsat (NO-44) offering 8 on/off commands, 5 telemetry channels and a serial port for the solar cell experiment telemetry. It also supports the Digital Comms Relay support of the PCsat/APRS mission. The packet uplink is on 145.825 MHz and the default downlands are in the 435 MHz band to avoid any possible interference with existing ARISS missions. PCSAT2 will have quad redundant transmit inhibits for EVA safety issues, thus, it is also easy to turn off to avoid any issues with other UHF ARISS experiments that may be activated in the future. Note that the mission lifetime of PCSAT2 is only 1 year. It is a sample-return mission, so there will not be any long term frequency or overload conflicts in spectrum management on ISS.

The PCSAT2 mission has several potential uses:

- A UI-Digipeater to help ease congestion on the currently shared ARISS PMS (Packet Mail system)
- A PSK-31 transponder for multi-user communications to improve accessibility for schools and ARISS outreach programs.
- An FM Voice repeater for full duplex crew communications to facilitate crew-to-school ARISS contacts.
- Routine Telemetry on the spacecraft systems.

Thanks to Bob, WB4APR for the above information.

Phase 3E

The proposed launch date for Phase 3E is early 2006. It is under construction at present. The AMSAT-Phase 3E satellite (P3E) is a communication and scientific platform destined for a highly elliptical orbit around the earth. The spacecraft is a joint project together with the P5A Mars mission and is being built by an international team under the leadership of AMSAT-DL. Additionally the spacecraft will be a test bench for technology developed for the P5A Mars mission. The main task of P3E is to act as communication platform for radio amateurs worldwide.

SSETI Express launch date announced

The launch date for SSETI Express and three 'cubesats' has now been confirmed as 25 August 2005, with the next day, the 26th, as a back-up. The satellite has now completed all its pre-launch tests and is presently back in the clean room where everything is having a final checkout and where the cubesats are being loaded into their launchers. Current plans show that the satellite will be packed and ready for dispatch to the launch site during the last week of June. SSETI Express will automatically downlink general telemetry at 9k6 on 70 cm and it will also be possible for amateurs to request specific downloads. It is planned that the 38k4 telemetry transmitter on 2.4 GHz will also be available for amateur voice operation as a Mode U/S transponder after initial tests on the satellite have been completed. AMSAT-UK provided the 2.4 GHz transmitter for the satellite.

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DX – news & views *continued*

PSK31. QSL via EC4DX.

J79PAK Dominica Pierre-HB9CUA plans his operation from 11th July until 3rd August he will be running 100 W on 40-6m. QSL via bureau or to his home call.

OX/EA3EKS Greenland, Hector should be active from 2nd to 5th August. QSL direct to his home call.

ON5NT, Ghis Penny, is back at home for a month of R & R but will be heading back to the United Arab Emirates on May 31st. He plans to be there for one month. QSL A6/ON5NT via ON5NT.

UT4UT, Nick Davydchenko, has postponed his IOTA trip to the Burmese island group of Irrawaddy/Yangon/Pegu (AS-167), which was expected from May 20 to 22. He now thinks his XY4U operation will take place in July.

STOP PRESS News.

Guy - FR7ZL - will be operating from FW8ZL from 13th July until 12th August on CW & SSB on 10.1 –14 –21 MHz. QSL direct only.

Comments, news & views please by August 8th for September Amateur Radio.

Special thanks to the authors of QTC DX PY2AA --- The Daily DX (W3UR) and 425 Dx News (I1JQJ) for information appearing in this months *DX news & views.*

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Beyond our shores *continued*

Malta:

CW operation needs exam

The Malta Communication Authority has automatically extended HF privileges to "codeless" Class B licensees. However, licensees in Malta still must pass a Morse code examination to operate CW on the HF bands.

Japan:

Relax Morse requirements

The Japan Ministry of Internal Affairs and Communications (MIC) took action May 24 to relax Morse code requirements for Amateur Radio licensing, but it did not eliminate them altogether. Effective October 1, 2005, the MIC will reduce the requirements for First and Second class licenses to 5 WPM – solid copy for two minutes. The previous code requirements for these licences were 12 and 9 WPM respectively. The MIC will drop the Morse requirement, now 5 WPM, for the Third class licence

(ARRL News)

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Another DC to DC converter for laptop use

Warren Stirling VK3XSW

The DC-DC converter described here is a modification of the K091 kit that was available from Oatley Electronics (http://oatleyelectronics.com/kits/k091.html) and is an extension of modifications suggested by Gil Sones, VK3AUI, to the original silicon chip design in an article posted to the wicen data group web site (http://datagrp.vic.wicen.org.au/lptpps.htm).

The Oatley kit is based on the original Silicon Chip sla battery charger design but provides for a higher output current and to this end includes a 40 A fast diode and a 40 A mosfet. Input and output filtering is also included.

I have modified the Oatley kit to provide the 18 V dc @ 1.8 A I needed to run a Toshiba laptop from a 12 V dc supply. The picture below shows these modifications:

A 470 µF 25 V electrolytic capacitor is added across the output. The original Silicon Chip design has a similar capacitor (250 µF) but the Oatley Electronics kit omits it. For a DC/DC converter application the capacitor is mandatory or the output will be unstable.

All the modifications described here refer to the component designations on the original Oatley electronics kit circuit, which is available for download at http://oatleyelectronics.com/pdf/k091.pdf. Diode D1 is changed from a 1N5404 3amp diode to a 6A40 6amp diode and fuse F1 is changed to a 5 amp type. This is because the output current requirements are greater than the original design allowed for so the input protection has been upgraded accordingly.

The kit provides wire to wind the current sensing resistor R2 and suggests two lengths in parallel for high output currents. This has been done in the prototype.

Capacitor C3 is changed from a 330pF ceramic to a 100pF high stability type; this roughly triples the oscillator frequency and makes a significant improvement to the conversion efficiency. Substituting a high stability capacitor for the new C3 and also the existing C4 makes the circuit largely immune to temperature variations.

A 10k 10-turn preset is added in series between the existing r6 (22k) and pin 6 of ic1 (mc34063ap1). This allows

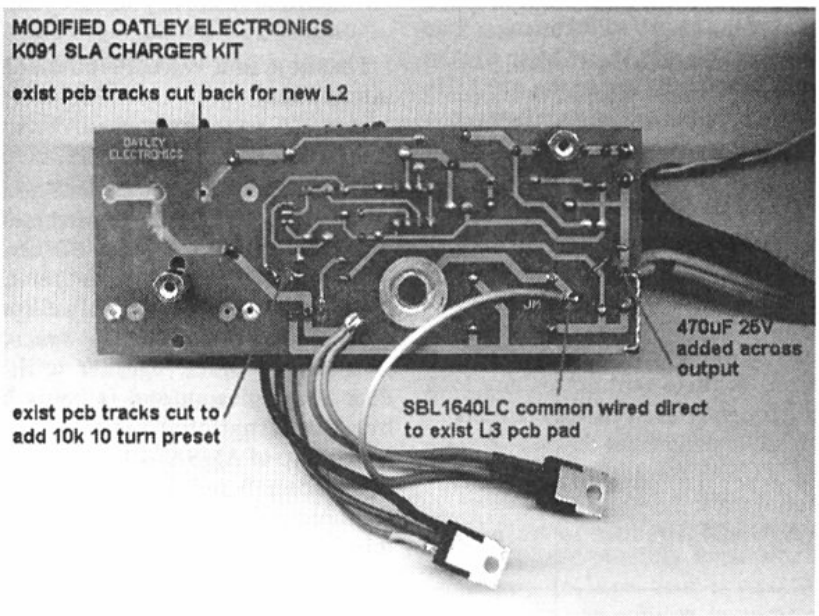

Photo 1

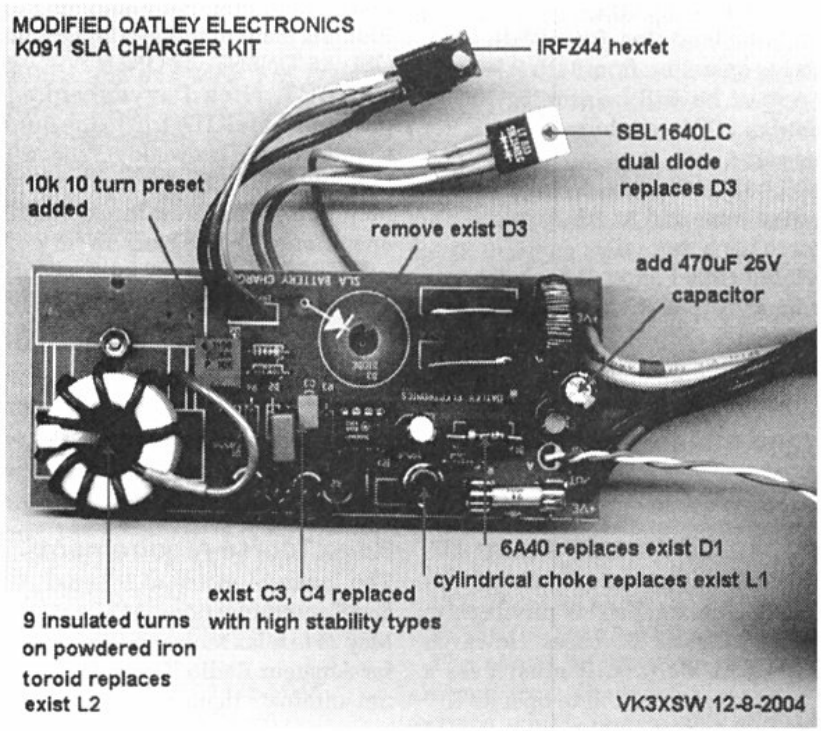

Photo 2

setting the output voltage between approximately 13.8 V and 19 V. The original split ferrite inductor supplied with the Oatley kit, L2, is replaced with a powdered iron toroid salvaged from a dead pc atx switchmode power supply. The toroid used in the prototype is painted yellow (permeability=8) and is approximately 27mm outside diameter, 14mm inside diameter and 11mm wide.

The salvaged toroid has all of the original windings removed and a single 9 turns evenly spaced winding added. In the prototype this winding was made from the 1mm copper wire used in one of the original windings and was covered in heat shrink to preclude the winding shorting to the toroid material, which is conductive. The new toroid is held flat to the pcb with a single cable tie.

Diode D3 is removed and replaced with a SBL1640LC removed from the same dead atx switch mode power supply as the new inductor L2. The original diode (a Motorola Z122108) does not switch fast enough with the higher oscillator frequency and generated significant heat. The replacement SBL1640LC has two high speed switching diodes mounted in a TO-220 case and, in comparison to the Motorola diode, runs almost cold. For this application both diodes are wired in parallel. Since both are on the same substrate no current sharing method is used between the diodes.

I've also tried an SBL2040LC recovered from the same dead atx power supply. This is also a dual diode package, using the larger top-3 package, the DC/DC converter efficiency is not as great when using it and the SBL2040LC got hotter than the SBL1640LC.

The input filter inductor L1 has also been replaced, with a rod type, which is 6mm diameter and about 11mm long. The winding is 15 turns of 1mm enamelled copper wire. While this wire has less resistance than that of the original toroidal inductor (and therefore won't get as hot for the same current draw) I've found that changing the input inductor only has a significant impact on the heat produced by the fet and the switching diode, both components are almost room temperature at sustained full output. The new L1 does get warm but runs much cooler than the original inductor it replaces.

The original output inductor L3 does get warm but I've found that changing it drops the converter efficiency and other components start getting hot.

I'm guessing that the " L" input filter (series L1 and parallel C2) and the π output filter (series L3 and parallel C5, C6) form a tuned circuit and changing either inductor (the easiest component to change) makes a significant impact on the converter efficiency and heat produced!

Both the SBL1640LC dual diode and the existing IRFX44 hexfet should be mounted on a heatsink, even though they ran at nearly room temperature in the prototype. They will need to be insulated from the heatsink as the metal tab on each of their cases has an electrical connection. In the prototype the metal case was used as the heatsink and also helps to suppress radiated interference from the converter.

The following measurements were taken on the prototype unit:

Input	Output	Efficiency
11.45v@3.8a	17.02v@1.8a	70%
13.8v@3.15a	17.72v@1.8a	73%
14.5v@2.8a	17.72v@1.8a	78%

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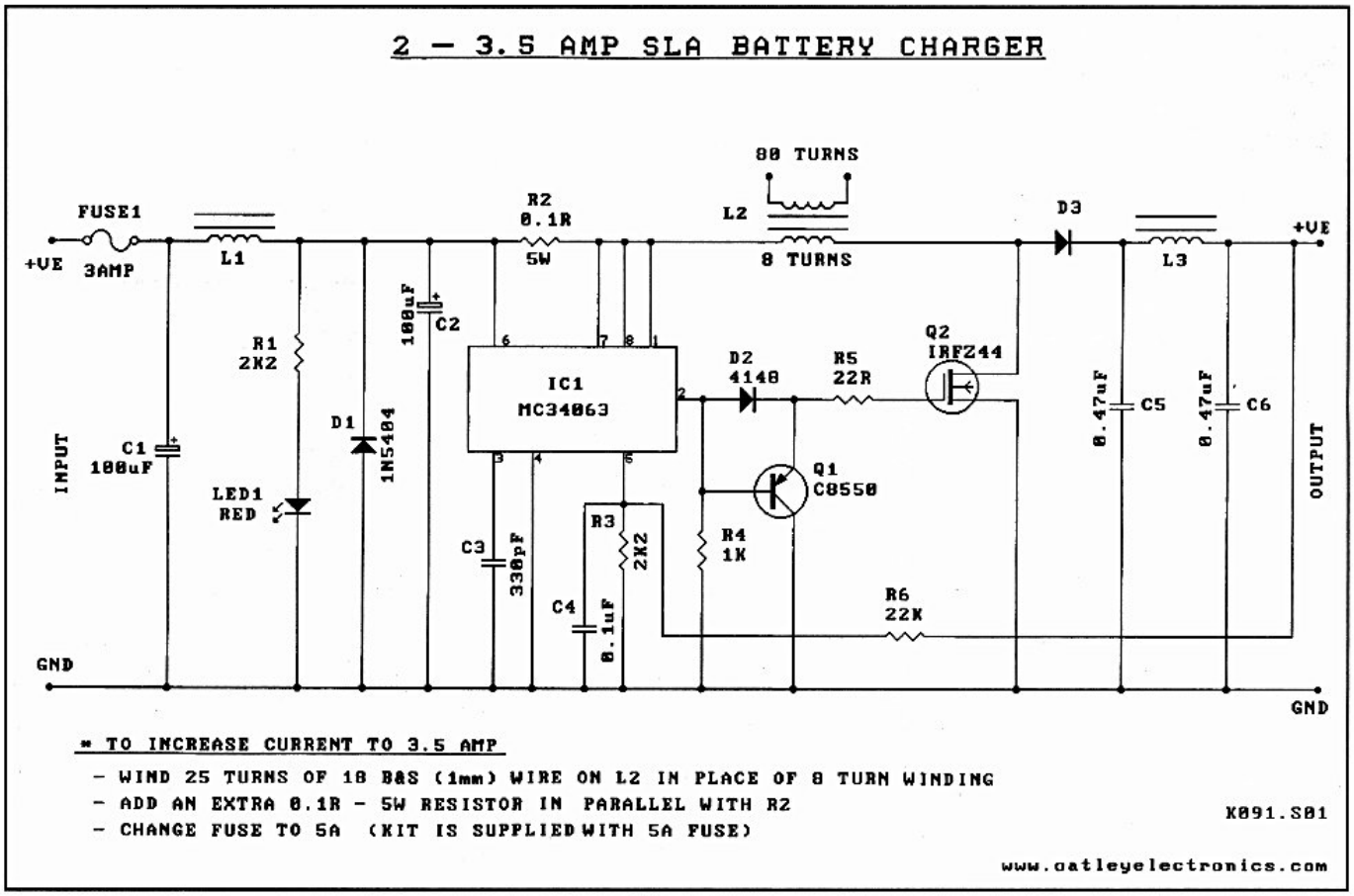

Figure 1

Contests

Ian Godsil VK3JS

Contest Calendar July – September 2005

July	1	Canada day Contest	(CW/SSB)
	9	VK/trans-Tasman 160 Metres Phone Contest	
	9/10	IARU HF World Championship	(CW/SSB)
	16/17	CQ WW VHF Contest (All modes)	
	23	VK/trans-Tasman 160 Metres CW Contest	
Aug	5	QRP Day Contest	(CW/SSB/FM/PSK31)
	6	TARA Grid Dip	(PSK/RTTY)
	6/7	10-10 Intl QSO Party	(SSB)
	13/14	Remembrance Day Contest	(CW/SSB/FM)
	20/21	Keymen's Club of Japan Contest	(CW)
	20/21	SEANET Contest	(CW/SSB)
	27	ALARA Contest	(CW/SSB)
	27/28	TOEC WW Grid Contest	(CW)
	27/28	YO DX HF Contest	(CW/SSB)
Sept	3	Russian RTTY WW Contest	(RTTY)
	3/4	All Asian DX Contest	(SSB)
	10/11	Worked All Europe DX Contest	(SSB)
	24/25	CQ WW RTTY DX Contest	(RTTY)

Greetings to all readers.

Last month I presented a pessimistic prediction in the hope that some of us may be stimulated into overcoming a level of apathy that I suspect exists in the Australian Amateur Radio Service. This month I am so pleased to comment on anther side of the picture through the results of the Harry Angel Sprint – see below.

Harry Angel Sprint

A very sincere thank you to those who gave time and effort to taking part and to those who also sent logs. A distinction must be made here, as there always seem to be more operators on air in a contest than ever send in logs.

The sending of the log is the final step of the "taking part" in a contest. It is not a question of finish or be buggered, I'm better than you, right or wrong, I didn't do too well so why bother, but simply a record of what you managed to achieve with your station.

It is particularly pleasing to note the participation of many of the newcomers to HF. I hope that they enjoyed the experience and will be motivated to try other events.

By the time you read this I expect the participants to have received their results and certificates.

For those interested in statistics, here they are for this event –

Total Logs: 23, via email 14, via mail 9
CW 3, SSB 18, Mixed 2

An apology to Andy Wood VK4KY and to all the other entrants in the Angel Sprint for a typing error in the results which were sent. That error has been corrected in the list below.

Points for thought

- Some comments were made that one station was so loud that it splattered over a wide band of frequencies. Do we need to run the full legal limit for contests within Australia?
- One correspondent complained that the event was not on ANZAC Day as listed on the SM3CER web site. Against this three operators said how glad they were that it was NOT on ANZAC Day, because of the length of the day already for many veterans, eg often up at 0400 hours for Dawn Services and Marches.
- I am genuinely concerned at the absence of VK6s, presumably because of the time of the contest, but also because of the difficulty in working across VK on 80 metres. Would another band or time make things more equable?
- VKs seem a long way behind the rest of the world in using loggers for contest work. Partly this is because of the unusual nature of some of our scoring systems compared to DX contests. However, as part of our code of keeping abreast of technology, if you have a shack logger with a contest module, or a dedicated contest logger, then PLEASE play with it at home and see if you can adapt the scoring to our local contests.

Also relating to contest logging, most loggers will score in the now world-wide accepted Cabrillo format. If your program does that, then please send

your log in that format as many Contest Managers now have this facility; also, if you are into DX contests, then this is the ONLY format that you will use for a legal entry these days.

- Several entrants in the Angel Sprint did not send addresses. If you read carefully you will see that you are asked to submit not only your log, but full details of who and where you are. There are good reasons for asking for this information and whilst you may think 'let the Contest Manager look it up', I assure you that this takes a very long time. Please abide by ALL the rules, including the Summary Sheet. (As a matter of interest, the Cabrillo logging format mentioned above does all this for you!)

If you have any comments on any of these points, please write to me, preferably via email as soon as possible, as I shall be in VK4 for several months with only limited access to email.

The Future

The Harry Angel Sprint is now history for 2005, but this month there will be the Jack Files, the 160 metre sections of the VK/trans-Tasman and next month the RD (see rules elsewhere) and ALARA Contests.

In their own ways these are all challenges to our technical and operating skills. Will you meet those challenges? I hope so.

73 and good contesting,

Ian Godsil VK3JS
Federal Contest Co-ordinator

Results of the Harry Angel Sprint 2005

CW			MIXED		
1st place	VK3JS	24 points	1st place	VK2BPL	64 points
2nd place	VK4AQ	20 points	2nd place	VK5UE	13 points
3rd place	VK4BUI	18 points			
SSB					
1st place	VK4KY	63 points	2nd place	VK5SR	57 points
3rd place	VK4YZ	55 points	4th place	VK2LCD	41 points
5th place	VK3EK	38 points	=6th place	VK6ZN/2	36 points
=6th place	VK7VH	36 points	8th place	VK4KSS	32 points
9th place	VK5YX	29 points	10th place	VK4SN	28 points
=11th place	VK3SC	26 points	=11th place	VK4FJ	26 points
=13th place	VK5HCF	25 points	=13th place	VK3PRA	25 points
15th place	VK4DMC	24 points	16th place	VK7JGD	21 points
17th place	VK3MUD	18 points	18th place	VK2JHN	14 points

VK2 news — Karuah Valley Radio Group

Exam Results

Grahame O'Brien
Exams Group leader, Karuah Valley Radio Group
02 49548688 vk2fa@arrl.net

It gives us great pleasure to inform you of the results of candidates who have done their amateur radio license exams with the Karuah Valley Radio Group.

The Group has conducted 2 examinations, the first examination being on Sunday 3rd April 2005. At this examination we had 4 candidates 3 novice candidates with 2.5 Hams being created. The .5 was a pass in regulations. We also talked one of the novice candidates into doing the extra full call exam paper that comes for emergency use. This candidate passed both and was very pleased that he did undertake both examinations.

Our 2nd examination was held on Wednesday 18th May, where we had 4 of 5 candidates pass. I think you would have to attribute the high pass rate to the Ron Bertrand course. All candidates had done Ron's wonderfull course

I would like to let you know of the success of 2 of the candidates, Ben Brice and his girl friend Penny Middleton.

Ben's father is Graham VK2VV and I must say that Graham has a smile from ear to ear.

Ben is only a few weeks away from going to spend 6 months in the jungles of East Timor as a volunteer worker. This being the situation Ham radio will be his only easy access to the outside world.

Ben only decided to do his exams 2 weeks before our exams were going to be held. I had a copy of Ron Bertrand's Novice course and I loaned it to Ben until the CD arrived from Ron.

Ben's Girl friend Penny was helping Ben with his study, Penny saw that the course structure was one that she thought that she would be able to pass and she decided that she would also sit for the exams so she would be able to talk to Ben whilst he is doing his work in the jungle.

I have to say it is very refreshing to see these outstanding young people coming into our hobby.

I think there are 2 factors that we can attribute to Ben and Penny's success: They are, the concentrated and dedicated effort that was put in by Ben and Penny and Ron Bertrand's ability to get the message across in his novice CD course.

The Karuah Valley Radio Group will be running more exams in the future and we would like to hear from any prospective candidates that might require our service.

The examination group leader for the Karuah Valley Radio Group is Grahame O'Brien and Grahame can be contacted of an evening on 02 49548688

The Karuah Valley Radio Group would also like to thank the staff in the national WIA office for their help in the processing of Ben's results so he can enter into negotiations with the United Nations to get an East Timor callsign before he leaves on his adventure.

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2005 Remembrance Day Contest
August 13–14

Introduced by Chris Edmondson VK4AA

Along with a new Contest Manager for this year come new rules and, importantly, a new way of determining the overall winner. The formal rules for the 2005 Remembrance Day Contest appear on the next page.

The RD Contest is an important event on the Australian amateur calendar, with heavy participation by individual operators and serious competition between states.

But we felt that some of the spark was dimming a little, and this year's changes are aimed at restoring the drive and renewing the enthusiasm in the grand old lady. We specifically wanted to strengthen the RD without confusion, and hope the new rules will help the RD retain its rightful place as the premier Australian contest event.

The Remembrance Day Contest for 2005 will be held on August 13-14 2005, for 24 hours commencing 0800 UTC on the Saturday evening.

Firstly, in essence, what won't change is the spirit of the thing. We haven't meddled with the basics which make the RD so very special. The winning state will be the one which stands head and shoulders over the rest. Those things won't ever change. Other things will.

Our first presents are to HF operators, who can now claim double points for all contacts in excess of 1000 km on any HF band. Contacts with any station within VK8, VK9 and VK zero will also earn double points for both sides of each contact. Logs for VK5 and VK8 will from 2005 be considered as coming from different states.

Logs should still show sequential numbers starting at zero, with bonus points tallied at the end of the contest and added to the claimed score.

SSB and CW will continue to be separate modes on HF, and, subject to licence privileges, any operator who works stations using 10 metres FM above 29 MHz will have the opportunity to immediately re-log the same station using SSB or CW below 29 MHz.

On VHF, we'll forge ahead by going back to the days when VHF operators could work a station on FM and immediately rework them on SSB or CW, or, indeed, both. This provision was inadvertently changed several years ago when the then manager moved to ban completely automated exchanges between packet stations.

The effect it had was to almost totally eradicate CW and SSB contest operation on the VHF and higher bands. This year we redress the situation.

From 2005, your VHF log can include stations worked on CW, FM or SSB. You do not need to separate the logs according to mode, nor do you need to apply contact numbers according to mode. However, you will continue to need separate logs for HF and VHF categories, due to the different rules applying to the two categories.

Many operators concentrate exclusively on VHF and higher band operation, and many of them will have seen that stations which might be very strong on six or two metres could be substantially weaker on 70 cm, and probably all but inaudible on higher bands. From 2005 we seek to address this imbalance by offering reward-based incentives for putting the work into higher band operation. Bonus points will be offered for both long distance contacts and higher band contacts.

All contacts on bands above 70 cm will attract double points, irrespective of and in addition to any other incentives already offered. They join 160 metre band HF operators who have enjoyed double points for some years, as have all CW operators.

From this year onward, HF operators using either 10 or 160 metres will be able to work stations within their own state boundaries.

We did consider also allowing WARC band operation, but decided to restrict HF operation to the 160, 80, 40, 20, 15 and 10 metre bands only.

When polled for comment on a recent VK1WIA broadcast, a number of people asked about multiple contacts. Until now, dupes were not allowed on HF but were allowed on VHF after only two hours. The VHF arrangements will not change this year. However, from 2005, repeat HF contacts will be allowed after four hours. This will encourage both more and longer operation, and real participation in the fun.

What's more, there's a special time for all operators still on the air between 1 am and 6 am local time. All points scored during those wee hours will be doubled. If you work a station whose time zone means they are outside the 1am to 6am point, only your points will be doubled. Although the contest runs during UTC times, the special "night owl" loading is determined strictly by your time zone.

Until the 1970s ushered in substantial VHF operations, a very convoluted point-scoring system was in place for HF, in which more points were allocated for contacts spanning multiple call areas than ones to neighbouring states. Even with computer technology, scoring could be a time-consuming process indeed, and very confusing for entrants.

However, it does seems appropriate to offer modest bonuses for better distances covered. From 2005 any HF contact in excess of 1000 km will earn double points, as will any VHF or higher contact which exceeds 100 km.

For scoring purposes, too, determining the overall winner is a different affair this year. The RD has always been state against state, but determining the winner was a confusing process involving overall "improvement factors". From 2005 on, who wins is a simple question of how many people take part from each state and actually submit logs. More than ever before, then, for your state to win, submitting your log is vital.

That's a basic summary of the changes. Each is designed to boost your scores without making the scoring too messy for either the competitor or the manager.

We would be remiss in not noting the excellent work of the outgoing manager of this contest, Alek Petkovic, VK6APK, who devotedconsiderable time and effort to the RD for more than 10 years. Thanks Alek

Good luck, and good contesting!

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Rules — 2005 Remembrance Day Contest

13/14 August 0800z Sat to 0759z Sun

Presented by Chris Edmondson, VK4AA

Purpose:

This contest commemorates the amateurs who died during World War II and is designed to encourage friendly participation and help improve the operating skills of participants. It is held close to 15 August, the date on which hostilities ceased in the southwest Pacific area.

It is preceded by a short opening address by a notable personality transmitted on various WIA frequencies during the 15 minutes prior to the contest. During this ceremony, a roll call of amateurs who paid the supreme sacrifice during WWII is read.

A perpetual trophy is awarded annually to the Australian State or territory with the best performance. The name of the winning State or Territory is inscribed on the trophy, and that State or Territory then holds the trophy for 12 months. The winning State or Territory is also given a certificate, as are leading entrants.

Objective:

Amateurs in each VK call area will endeavour to contact amateurs in other VK call areas, ZL and P2 on HF bands 1.8 to 30 MHz. On 50 MHz and above amateurs may also contact other amateurs in their own call area.

Contest Period:

0800 Z Saturday, 13 August to 0759 Z Sunday, 14 August, 2005. As a mark of respect, stations are asked to observe 15 minutes' silence prior to the start of the contest, during which the opening ceremony will be broadcast.

Rules:

1. Categories:
   (a) High Frequency for operation on bands below 50 MHz;
   (b) Very High Frequency for operation on and above 50 MHz;
   (c) Single Operator;
   (d) Multi-operator;
2. Within each Category the Sections are:

(a) Transmitting Phone (AM, FM, SSB);

(b) Transmitting CW (CW); Note: CW in this context means CW only; any other digital modes such as Packet, RTTY, AMTOR, PSK31 etc are excluded from the contest.

(c) Transmitting Open (a) and (b);

(d) Receiving (a), (b) or (c).

3. All amateurs in Australia, Papua New Guinea and New Zealand may enter the contest, whether their stations are fixed, portable or mobile.
4. Cross-band and/or cross-mode contacts are not permitted.
5. Call "CQ RD", "CQ CONTEST" or "CQ TEST".

6a. On bands up to 30 MHz stations may be contacted at intervals of not less than four hours since the previous contact on that band and mode.

6b. No points will be awarded for contacts between stations in the same call area on HF, save on the 160 metre and the 10 metre bands, on which entrants may work stations in the same call area.

6c. On the 10 metre band, contacts may also be made using the FM mode, using simplex only, on frequencies above 29.0 MHz only. This will be considered a different mode for scoring purposes, so an SSB or CW contact could immediately be made with the same station below 29.0MHz for an additional score.

7a. On 50 MHz and above, the same station in any call area may be worked using any of the modes listed at intervals of not less than two hours since the previous contact on that band and mode.

7b. For the VHF category, up to three contacts may be made with the same station consecutively on each band, but must be made using the different allowable modes of CW, SSB and FM. However, the different modes must be within the frequency ranges stated in the text descriptions of the 2005 Call book as 'mode' only. For example, on the two metre band, RD Contest CW contacts may only be made in the range 144.050 to 144.100 MHz. SSB contacts are restricted to 144.100 to 144.400, while FM contacts must be above 146.000 MHz. The national simplex calling channels (146.500 MHz on the two metre band), and the frequencies either side thereof, excluding recognised repeater frequencies, are the frequencies of choice. When changing modes, entrants must also change frequency.

7c. All scores obtained between the entrant's local time hours of 0100 and 0600 are doubled. If working into an area where the time is outside those hours, the score is doubled only for the station whose local time is 0100 to 0600 hours.

8a. Both single and multi-operator entries are permitted. To be eligible as a single operator, one person must perform all operating and logging activities without assistance other than computer logging, using his or her own callsign. More than one person can use the same station and remain a single operator providing that each uses his or her own callsign, submits a separate log under that callsign and does not receive operating or logging assistance in any way other than computer logging during the contest.

8b. Holders of more than one licence or callsign may submit a separate entry for each callsign held.

9a. Multi-operator stations are only allowed one transmitter per band/mode at any one time. Simultaneous transmissions on different bands are permitted. Simultaneous transmissions on the same band but different modes are permitted.

9b. Automated operation is not permitted. The operator must have physical control of the station for each contact. CW and voice keyers are permitted, as is the use of computers for logging.

10. For a contact to be valid, numbers must be exchanged between stations making the contact. Exchange RS for phone and RST for CW, followed by three figures commencing at 001 and incrementing by one for each successive contact.

11. Contacts via repeater or relay are not permitted for scoring purposes. Contacts may be arranged through a repeater, although contact numbers may not be aired there. Operation on repeater frequencies in simplex is not permitted. Satellite operation is not permitted for this contest.

12a. Score: on 160 metres two points per completed valid contact; on 23 cm or higher bands two points per completed valid contact; on all other bands one point; on CW irrespective of band, double points.

12b. All HF contacts whose total distance between stations is in excess of 1000 km and all VHF contacts whose total distance between stations is in excess of 100 km, will receive double points. In all cases, distances may be estimated. The Contest Manager's calculation of distance shall be the final arbiter.

12c. Contacts with any station within VK8, VK9 and VK zero will also earn double points for both sides of each contact.

13. Logs should be in the format shown below and accompanied by a Summary Sheet showing callsign; name; address; category; section; for multi-operator stations a list of the operators; total score; declaration: I hereby certify that I have operated in accordance with the rules and spirit of the contest; signed (postal mail only); date.

14. Entrants operating on both HF and VHF are required to submit separate logs and summary sheets for both categories.

15. VK entrants temporarily operating outside their allocated call area, including those outside continental Australia as defined for DXCC, can elect to have their points credited to their home Division by making a statement to that effect on their summary sheet(s).

16. Logs can be submitted by electronic mail or postal mail. By mail, send logs and summary sheets to: RD Contest Manager, Chris Edmondson, VK4AA, PO Box 123, Eagle Heights, QLD 4271. By E-mail, PLAIN TEXT logs only may be sent to vk4aa@wia.org.au. In either case, logs must be received by last mail on Friday 16 September, 2005. Late entries will not be eligible.

17. Certificates will be awarded to the leading entrants in each section, both single and multi-operator; in each State; P2 and ZL. Entrants must make at least 10 contacts to be eligible for awards, unless otherwise decided by the Contest Manager.

18. Any station observed as departing from the generally accepted codes of operating ethics may be disqualified.

Determination of Winning State or Territory

The scoring system used until 2004, incorporating an "improvement factor", has been abandoned. For 2005 a new scoring system applies as follows:

Scoring will be achieved by taking the total number of logs for each State or Territory, divided by the total number of licences issued in that State or Territory (excluding beacons and repeaters) as published in the WIA Callbook for that year, and multiplying by the total score for that State or Territory. Points can only be considered where a station has submitted a valid log.

Logs for VK5 and VK8 will from 2005 be considered as coming from different states.

Unless otherwise elected by the entrant concerned, the scores of VK0 stations will be credited to VK7 and the scores of VK9 to the mainland call area which is geographically closest. Scores of P2, ZL and SWL stations will not be included in these calculations.

Receiving Section Rules

1. This section is open to all SWLs in Australia, Papua New Guinea and New Zealand. No active transmitting station may enter this section.
2. Rules are the same as for the Transmitting Section, save for scoring, where double points may be claimed where one of the received stations is in excess of 1000km from the receiving location on HF, or more than 100 km from the receiving location on VHF.
3. In all cases, distances may be estimated. The Contest Manager's calculation of distance shall be the final arbiter.
3. Only completed contacts may be logged, ie it is not permissible to log a station calling CQ.

Layout of logs

The log should be in the format shown below, whether submitted electronically or via the postal mail.

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Sample Summary Sheet:

Remembrance Day Contest 2005

Callsign:	VK1xxx
Name:	Operator's full name
Address:	Physical address of contest station
Category:	HF or VHF / Single or Multiple Operator
Section:	Transmitting Phone, CW or Open
Total Score:	number of points claimed
Declaration:	I hereby certify that I have operated in accordance with the rules and spirit of the Contest.
Signed:	Your signature if log is submitted via mail.
Date:	20 August 2005

Sample Transmitting Log

Remembrance Day Contest 2005

Callsign: VK1xxx
Category: HF or VHF / Single or Multiple Operator
Section: Transmitting Phone, CW or Open

Time (UTC)	Band	Mode	Call worked	Number Sent	Number Rcvd	Pts
0801	14	SSB	VK2QQ	58001	59002	1
0802	14	SSB	VK6LL	59002	59001	2
0806	14	SSB	VK5ANW	59003	59001	1
0808	14	SSB	ZL2AGQ	56004	57004	2
0811	14	SSB	VK4XX	59005	59008	1

Example Receiving Log

Name/SWL Nr:
Category: HF
Section: Receiving Phone

Time (UTC)	Band	Mode	Call 1st op	Call 2nd op	Number 1st op	Number 2nd op	Pts
0801	14	SSB	VK1XXX	VK2QQ	58001	59002	1
0802	14	SSB	VK1XXX	VK6LL	59002	59001	2
0806	14	SSB	VK5ANW	VK1XXX	59001	59003	1
0809	14	SSB	VK7AL	VK2PS	59007	58010	1

2005 Wadda Cup Contest

The Central Highlands Amateur Radio Club of Tasmania (CHARCT) will hold the 2004 80 m Dash for the Wadda Cup on Saturday, 24 September 2005.

With the popularity of the Wadda Cup Contest growing each year, 2005 should be an exciting event. If you have not had a go at the contest, then I encourage you to join in the fun of the 2005 dash. Unique to this contest is the on air call back that is held at the conclusion of the event. The atmosphere builds as the score count down nears the eventual winner.

As in past years, the Contest Manager takes on board any worthwhile suggestions that could help improve the contest for the following year. Past participants will know that the Wadda Cup Contest is ever evolving and this year is no different. The date has been moved from October to September. This is to alleviate the problems of time zone differences due to daylight saving time. It was also thought that by holding the event a little earlier, we may not have the static crashes to deal with. The time format may now be in UTC or local time.

Contest bonus

The contest also offers amateurs the opportunity of accumulating contacts for two Tasmanian awards. The CHARCT Tassie Trout Award is available to any amateur that makes contact with 14 CHARCT members. Full details, including the current membership list, are available on the club's website www.vk2ce.com/vk7cht

Also, the Tasmanian Division of the WIA has the Tasmanian Devil Award. Contact with 50 VK7 amateurs is the only requirement on HF. More details are available on the VK7 division website www.tased.edu.au/tasonline/vk7wia

Contest aims

- Encourage on air activity in a short, friendly contest.
- Provide amateurs with the opportunity of accumulating contacts for the Tassie Trout Award and the Tasmanian Devil Award.
- Encourage entry by first time contesters.
- Promote on air activity of VK7 amateurs.
- Encourage SWL participation, especially SWL's that have not entered a contest.

The complete Wadda Cup rules are as follows -

Contest date and time

The contest will be held on Saturday, 24 September 2005. The contest will be 60 minutes duration. The start time is 1030 UTC (8.30pm EST) until 1130 UTC (9.30pm EST).

Pre-contest announcements

The contest on-air coordinator will be VK3EK, Rob Ashlin, the winner of the 2004 event. Rob will operate as VK7CHT/3 (CHARCT club callsign) during the contest. Contact with VK7CHT/3 will earn 2 bonus points. VK7CHT/3 will not be eligible for the Wadda Cup or any contest award certificates.

All contestants are asked to listen on 3.585 MHz (+/-), 15 minutes prior to the start of the contest. CHARCT President Bob Geeves, VK7KZ, will give a short address and officially launch the 2005 80 m Dash for the Wadda Cup. VK7CHT/3 will give an UTC time check, on this frequency, 2 minutes before the start time.

General rules

1. The contest is open to all VK amateurs and SWLs.
2. A station may only be worked once during the contest.
3. The exchange will consist of your call sign and your Christian name. Sequential numbers DO NOT need to be exchanged. RS exchange is not required.
4. The contest is phone only, using LSB on the 80 m band. Frequencies to be used are from 3.540 MHz to 3.625 MHz.
5. Maximum power is 100 watts.
6. Entry categories -

   Category a) Single operator entries only. No multi-operator entries are allowed.

   Category b) Short wave listeners (SWL).
7. The winner of the 2005 Wadda Cup will be the on air contest coordinator for the 2006 event. This is not a great chore. The on air manager only needs to operate the CHARCT club callsign (VK7CHT/P) and conduct the contest call back at the end of the contest. If, for any reason, the winner is unable to operate as the on air contest coordinator for the following year, CHARCT will take over the role for that year.

Scoring

Category a)

i. Contact with any VK amateur scores 1 point.

ii. Contact with VK7CHT/5 scores 1 contact point plus 2 bonus points = 3 points.

Category b)

i. All recorded contacts score 1 point

ii. VK7CHT/5 may be recorded more that once, however, the 2 bonus points may only be counted once.

The contact and move rule

1. After calling CQ contest and establishing a contact, the calling station must move its calling frequency by at least 5 kHz.
2. A station answering a calling station may make one call on the same frequency and exchange names with another station. The calling station must then move its calling frequency by at least 5 kHz.

Example - VK7VH calls CQ contest on 3.560 MHz. VK7KZ answers the call and exchanges names with VK7VH. When the contact is completed, VK7VH must move frequency by at least 5kHz. VK7KZ may then call CQ contest on 3.560 MHz. VK2CE answers VK7KZ and exchanges names. VK7KZ must move at least 5 kHz etc etc.

Logs

1. All participants must keep a separate contest log sheet. Use 3 headings - UTC time, Station worked, Name (Christian name of the station worked).
2. SWLs should record UTC time, the call sign of both stations and the name sent by each station.
3. Retain your log for checking. During the contest call back, the on air contest coordinator will advise you if your log is required to be sent to the contest manager. If, for any reason, you are not able to participate in the call back, you must send your log to the contest manager for inclusion in the contest results.
4. It is a pre-requisite that the contest winner, 2nd place contestant(s), 3rd place contestant(s), as per the call back, and all SWLs must send their log no later than 24 October 2005.

Send postal entries to -

The 2005 Wadda Cup Contest Manager
2/6 Lissadell Court
Newtown
Tasmania 7008

Send e-mail entries to –
vk7vh@hotmail.com

E-mail entries will be accepted in txt, word 6, excel 6-format or text output from any logging program. Attach the file to the e-mail. Please do not put your log into the body of the e-mail text. Put your call sign 2004 Wadda Cup Log into the subject heading, please, please ensure that this happens. Can you imagine the confusion when the contest manager receives logs without call signs in the file?

Logs must be legible and show the details required in Log rule1 (Log rule 2 for SWL). Attach a summary sheet or make a note in the main body of the log, showing the entrants callsign, name, address and claimed score. If your log is not received by the due date, you may be excluded from the contest results. You will be advised during the call back if your log will be required as a check log.

The winner

All contest participants are asked to listen for VK7CHT/3 on 3.585 MHz (+/-) immediately after the conclusion of the contest. Add up the number of contacts that you made, during the contest, and if you worked VK7CHT/3 add 2 bonus points to your final score. Follow the on air roll call to find out the provisional winner of the Wadda Cup and other contest award certificate winners.

1. The winner will be the entrant with the highest score.
2. Should there be more than one entrant with the highest score, an on air count back will be conducted by the on air contest coordinator. The count back will be based on the number of contacts made during specific time blocks. Although the count back procedure will be decided prior to the contest, details will only be revealed during the count back.
3. The provisional winner, 2nd place contestant(s) and 3rd place contestant(s) will be declared official when logs have been received and checked by the contest manager.
4. The contest manager's decision will be final.

The awards

1. The winner will be awarded the Wadda Cup, suitably engraved, for a period of 12 months. The Wadda Cup is a classic silver cup and has become known as the "Old Mug". The winner will also receive a replica of the Wadda Cup and the first place award certificate.
2. All 2nd place contestant(s) and 3rd place contestant(s) will receive an award certificate.
3. The highest SWL score will receive a special contest award certificate.

Results

When the contest manager has verified all logs, the results will be published on the CHARCT website. Results will also appear in Amateur Radio magazine.

If you need any further information about the Wadda Cup Contest, the Central Highlands Amateur Radio Club of Tasmania (the contest organisers) hold an on air quiz night every Thursday at 8.30 pm local time. Tune around 3.585 MHz and give them a shout. You would be most welcome to join in the quiz, which is a lot of fun and usually lasts for 30 – 40 minutes. Alternatively, the Tasmanian Devil Net is on the same evening, ably run by Dale (VK3YR), at 8.00pm. Information is also available on this net.

We encourage you to have a go at the 2005 80 m Dash for the Wadda Cup. Have fun during the contest and don't forget to join in the roll call at the end of the contest.

Goodluck and happy contesting

Vince Henderson, VK7VH
2005 Wadda Cup Contest Manager

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Silent Key

We are sad to announce

Geoff Taylor VK5TY,

OM of Christine VK5CTY, ALARA, died peacefully while on holiday in the UK.

VHF/UHF - an expanding world

David Smith VK3HZ – vk3hz@wia.org.au
Leigh Rainbird VK2KRR – vk2krr@wia.org.au

Weak signal

David Smith VK3HZ

During the month of May, some heightened solar activity resulted in auroral openings in the south of the country.

Thanks to Tony VK3CAT in Melbourne for the following report:

"Sunday 15th June from 0700 Z 0817 Z. The Space Weather forecast was for possible auroras following a CME event. At 5 pm local time (0700 Z), the Wagga Wagga TV video carrier on 46.240 MHz was received with heavy AU distortion. For the first time ZL TV video on 45.250 MHz was also received with AU distortion and ZL TV audio on 50.750 MHz was received with severe distortion. As I have never logged ZL TV in an AU event, it may be possible that there were also some local mid-year Es around as well providing the link.

The first station worked was Karl VK2GKA on 144.100 CW RST 55A. Ron VK2BHO was worked on 50.120 CW RST 52A. Other stations worked on six metres were Norm VK3DUT at Lakes Entrance and Kevin VK3WN at Ballarat.

Further 2 metre contacts were on SSB with Peter VK5ZLX, Colin VK5DK, Karl VK2GKA and a CW / SSB contact with Trevor VK5NC. Towards the end of my operating time - had to cook the BBQ - Doppler shift on 2 metres was close to 2 kHz whilst the maximum Doppler shift on 6 metres was several hundred Hz.

It was nice to hear some CW operation on both 2 & 6 metres. CW operation was much easier and quicker than the SSB mode with operating speed only at about 15 WPM."

Ed VK3BG from KooNooMoo on the bank of the Murray River reports:

"Between 0712 Z and 0839 Z, I worked VK3KAI, VK5ZLX, VK3ZYC, VK1ZQR, VK3KEG, VK3DUT, VK3BBB, VK5NC and VK3ZQB. All the signals were around S9 or better, readability 4, peaking 150 true from here. There were other VK2, 3, & 5 stations also that I did not work, as well as some CW.

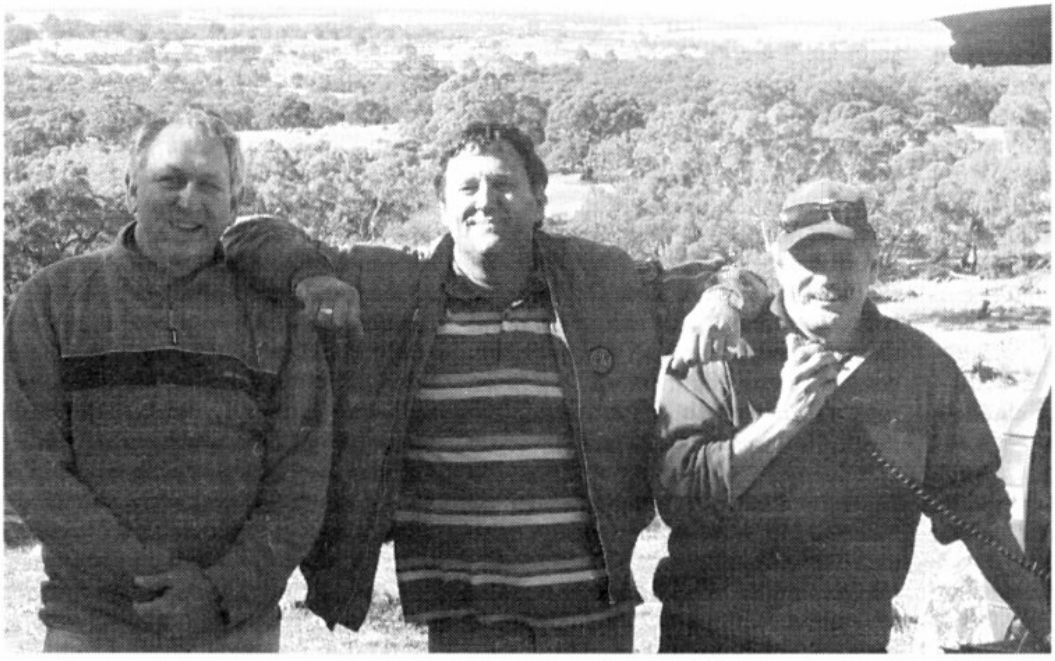
It affected HF as well, signals on 40 m were very fluttery around 0730 Z when I worked my mate Ron, VK4BRG/P west of Charlieville, but nothing was heard from him on 6 m at that time.

The Aurora reappeared around 0700 Z on Mon but no one worked from here."

Peter VK3KAI in Churchill reports working VK3ZQB, VK3KEG, VK3BG, VK5ZLX, VK2GKA and VK5NC. Also heard were VK3BJM and VK3ZYC. Surprisingly Jim VK3ZYC, a relative neighbour, was not audible direct, only via Au - too much dirt in the way.

Trevor VK5NC reports going portable to the local hilltop in Mt Gambier. There he worked VK5ZLX, VK2GKA, VK3ZYC, VK3DUT, VK3KAI, VK3CAT, VK3BG and VK3BBB. Activity was a bit scarce. Most signals were very strong and some a little difficult to copy.

Other activity for the month included some tropo enhancement from VK3 to VK5, thanks to the good weather and a number of slow-moving high pressure cells passing across the area. A small group of operators seem to be consistently present at the VK5 end of the contacts. Brian VK5UBC in Gawler, Garry VK5ZK in Goolwa, John VK5PO in Eden Valley and Peter VK5ZLX in Angaston all put good signals into Melbourne and further afield. Signals should improve following work currently in progress on antenna systems. We managed to capture a photo of Peter, John and Brian, operating from an impressive location in the Barossa Valley area.



Peter VK5ZLX, John VK5PO and Brian VK5UBC

Aircraft enhancement

Several years ago, Barry VK3BJM moved from his Melbourne location to a country site near Kyneton. He has been re-building his station and sent the following report on his findings working the morning aircraft enhancement net from his new location.

" A couple of interesting AE contacts in the last couple of months from near Kyneton.

Way back on February 26th, at 2126 Z, I worked Kerry VK2BXT (Campden) with 41 - 52 reports exchanged. On April 9th, at 2256 Z, I worked Bill VK2ZZF (Cherrybrook - near Pennant Hills in Sydney) with 51 - 55 reports exchanged. On May 6th, at 2225 Z, I (just) managed to work John VK2TK (Wentworth Falls) 51 - 51 reports exchanged. On June 3rd at 2256 Z I worked Brian VK2BX (Gerroa - on the NSW coast between Kiama and Nowra) with 51 - 53 reports exchanged. Very pleased to have worked Brian, considering his location cannot be ideal for shooting in my direction. I've worked Guy VK2KU (Marulan) at times of 2157 Z and 2149 Z (during Daylight Saving) this year.

I work, reasonably regularly, Karl VK2GKA (Mittagong) and I thought I'd look back through the log since I fired up here near Kyneton in October 2003. I found I have worked Karl 41 times over the 20 months, and 11 of those contacts have been made in the 10-minute window between 2250 Z and 2300 Z (2150 and 2200 Z during Daylight Saving). 10 contacts have been completed between 2235 and 2245, and 9 contacts between 2210 and 2220. Four contacts were made in the 4-minute window either side of 2225 Z.

It's fairly obvious that there are a couple of hotspots for AE between Sydney and Kyneton, and the ten-minute window between 2250 and 2300 Z seems to be the pick of them. My belief is that it is aircraft flying between Melbourne and Brisbane that are best positioned to provide this path, and slight adjustments to the time window would provide similar contacts for other stations in Central Victoria with a reasonable operating location and take-off to the NE. I'm not convinced that I get much assistance from the Melbourne-to-Sydney aircraft, when working into the Sydney area - though they provide plenty of assistance when working the area between Canberra and Nimmitabel.

I haven't gone through the many contacts I had with Gordon VK2ZAB before he closed operations, but I think I should, to help clarify the pattern."

GippsTech 2005

Hopefully this magazine will be out before the weekend of July 9th and 10th when GippsTech 2005 is due to be held at Churchill in southeast Victoria. GippsTech is an event not to be missed by the serious weak signal operator.

So far, the list of presentations on offer include:

- Calculating Troposcatter Losses - Rex VK7MO
- Lightning - Effects of a Near Strike - Guy VK2KU
- More Ideas and Measurements of Elevated Ducts - Andrew VK3KAQ
- Noise figure measurements over the years - Chris VK5MC
- High stability crystal ovens based on zero temperature gradient - Rex VK7MO
- Modification of the FT847 to eliminate frequency drift - Joe VK7JG
- Small Station EME - David VK3HZ.
- The new modulation scheme: COFDM, and it's application in Digital TV, Digital Radio Broadcasting, and digital voice on amateur radio - Glen VK2JPR
- A 3-phase noise blanker - Glen VK2JPR
- Simple VHF S-Meter Calibrator - Neil VK2EI
- Frequency Measurement using Modern Transceivers - Neil VK2EI
- An outline of recent projects using PICs: repeater controller, Wx station data converter & dish direction controller - John VK5DJ.
- Recent advances in optical communications. Chris Long
- Myth Busters regarding High power permits. Doug VK3UM

For more information, steer your browser to http://www.qsl.net/vk3bez/

Please send any Weak Signal reports to David VK3HZ at vk3hz@wia.org.au.

The magic band – 6 m DX

Brian Cleland VK5UBC

The month of May produced many good sporadic E openings. There were several openings down the eastern coast and from VK5 to VK4 & 2 as well as openings from ZL to VK2, 3 & 4.

From VK5 openings occurred on the following days during May:

2nd to VK4
6th to VK6
10th to central coast VK2
12th to southern VK4
13th to southern VK4 and VK7
21st from far north Queensland to south of Sydney
22nd to northern VK4,
24th to VK8 (Alice Springs beacon)
29th to north coast VK2, southern VK4 and VK8 (Alice Springs beacon)

The weekend of the 21st/22nd May was exceptional with the band being open for several hours on both days. Brian VK5UBC worked 21 different stations from far north Queensland to south of Sydney on these days. As well as these contacts the FK8 beacon was up to S9 on the 21st with FK8HA heard calling CQ and on the 22nd the C21 beacon from Nauru was up to S3 for over an hour.

Norm VK3DUT also reports good conditions on the 22nd May into VK4 as well as both the FK8 & C21 beacons being audible. On the same day Norm also worked Rod ZL3NW. During an Aurora opening on the 15th May Norm reports hearing the ZL3 beacon but despite many calls did not hear any ZL's. The VK7RST beacon was heard in Adelaide during the same opening.

The 14th May also produced an excellent opening from VK5 to JA. Col VK5RO and Steve VK5ZBK worked several JA stations with signals up to S9 over a 2-hour period. The logger indicates that the JA's also worked into VK2 on the same day

John VK4FNQ from Charters Towers reports working many VK2, 3 & 5 stations on the 21st, 22nd & 23rd May as well as Rod ZL3NW and Murray ZL3MH. John also reports working JA's on the 14th, 15th & 17th May along with the South Korean stations HL3IUA & DS1GQS.

Congratulations go to Joe VK7JG at Launceston who completed a 6 m EME contact with ON4IQ Belgium over a distance of 17,011 km, which is believed to be an Australian record.

If you want to know what's happening on 6 m, try accessing this site http://www.qsl.net/vk4cp/clusters.htm which will allow you to view 3 clusters/loggers.

Please remember to send any 6 m DX information to Brian VK5UBC at bcleland@picknowl.com.au. I can only report what I know.

Spotlight on SWLing

Robin Harwood VK7RH

Propagation is extremely poor lately and there has not much about. I notice that in Europe, complaints have been raised about the width of DRM transmissions, particularly within the 49 metre broadcasting allocation.

Aim to commence DRM in Pacific

So far, no DRM experimental transmissions have been made in Australia yet Radio New Zealand did briefly demonstrate this digital mode at a recent symposium in Auckland. Their aim is to eventually commence broadcasts to the Pacific for rebroadcast by local stations. The prohibitive cost of current models of DRM would be beyond the reach of the many in the region. Many in the Pacific Islands depend on this station for news and weather and mainly use portable receivers and I expect that analogue transmissions will continue for some time.

New private SW station

A new Christian broadcaster recently commenced broadcasting from Port Moresby on shortwave. It is Radio Wantok and has been heard on 7125 from 0800 till sign-off around 1200. I believe it has been heard in British Columbia and Oregon but all I am hearing is a carrier with the modulation being low. This is not surprising, as I believe it is only rated at a kilowatt and is using a radiation pattern to emphasise skywave. This is the second private shortwave station in PNG after a Catholic station commenced last year in the 90 metre tropical allocation. Naturally the main station from Port Moresby on 4890 has been heard for decades as their sender is rated at 100 kW.

New toy brings end to birdies

I now have a brand-new Athlon 64, replacing my ancient Pentium, which finally died. Fortunately I was able to retrieve all of my important data and transfer this over. I also was pleasantly surprised to note a big drop in the presence of birdies and buzzes from this new unit. Some still remain but nowhere near what I had with the Pentium. I also was contemplating upgrading to broadband but hit a brick wall. My existing ISP said no and I could not get an answer from the monopoly because I got fed up being placed on hold or trying to understand a call centre operator outside of Australia. One wonders if customer service is a thing of the past.

Croatia in English

I did hear the Croatian Radio in English on 9925 at 2200 It is only on weekdays and is beamed to South America and is followed by Spanish at 2130. I believe that the transmission for Australia is on between 0500 and 0700 on 13820 via senders in Germany. The majority of the program is in Croatian with an occasional 5 minute English news bulletin.

Don't forget you can email me your comments to vk7rh@wia.org.au.

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VHF/UHF - an expanding world *continued*

2 m & 70 cm FM DX

Leigh Rainbird - VK2KRR

Not a great deal to report on for the month of May. From about the first week into May I began dismantling my 2 & 70 FM arrays for maintenance, so I have not been active on the bands to note down any conditions or contacts worthy of mention, so am relying on other input.

First duct opening of the month occurred in the evening of 1/5 and morning of 2/5. After 7.30 PM I found the Adelaide Crafers repeater 147.000 at 764 km and worked Mark VK5AVQ and Greg VK5THA.

An interesting twist after 11 PM, rarely heard here, the Broken Hill repeater on 147.000 was coming through at a good 5/8 signal at 638 km. I was lucky to catch up with Paul VK2YVG from Broken Hill on their repeater.

Around midnight and back into the Crafers repeater, Rob VK5MM was about, and some rare DX from Kangaroo Island with Bill VK5ACY putting in a good signal.

Thanks to John VK3HJW for the following, which occurred on the 6/5. John was able to work Brian VK5UBC at Gawler via the Mt Macedon repeater 147.250. John also mentions hearing John VK5PO at Eden Valley also on Mt Macedon. Andrew VK3FIX was heard working into the Mt Barrow repeater 147.000, VK7RAA, and was speaking with Karl VK7HDX.

For the last 20 or so years Michael VK2KBC has been actively mobile whilst driving his semi trailer around Sydney . In the early days with the call of VK2NBB he worked DX daily on 10 and 15 metres and got to be well known in the US .

Michael had a list of stations that were about on the Heathcote Repeater 15 yrs ago and it totalled about 80 operators . I put this down to Michael acting as a beacon, always being available for a chat throughout the working day.

Later on when IRLP became active on the Blue Mtns repeater he once again renewed his DX operations . Stations from the US would call him for a chat just as they used to do on HF years ago .

Michael has decided to hang up his boots and concentrate on his retirement and a move to the North Coast . I'm sure there are lots of people like myself that wish him well and hope to catch up with him again on the air .

Chuck VK2SS

Please remember to send through any 2 & 70 FM DX reports to Leigh VK2KRR at vk2krr@wia.org.au.

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How to write for Amateur Radio magazine

Bill Roper VK3BR

***Amateur Radio* is the membership journal of the Wireless Institute of Australia (WIA). It is a forum for members to publish their amateur radio experiences, whether it is their latest technical achievement, a new antenna or an operating experience. The editors do not rewrite articles to any corporate style, but try to retain the original style of the author while correcting, where necessary, spelling, grammar, punctuation and the accuracy of what is written.**

It's easy to write for *Amateur Radio*. Hundreds of amateurs have already done it. Few of them are professional writers. All get a lot of satisfaction out of hearing their fellow amateurs say they enjoyed reading their article in the latest issue of the WIA journal.

Just about anybody can write. Some can turn an elegant phrase, while others just explain what they have in mind and keep right to the point. Practice develops skill in writing, just like anything else you do. The more you write, the easier it gets and the better it is.

The subject

Many amateurs love reading about simple equipment, and antenna construction and design articles. While most of us will not actually build the project we often follow the construction in our minds and enjoy reading about it.

It pays to be extremely careful in checking your article, particularly circuit diagrams, for any errors, or the mail will pour in.

If you are experimenting in a new field, you may want to write about it and let others know what you are doing and discovering. Bear in mind, however, that you are writing for a wide range of amateurs, from beginners to experts. Gear your article, if possible, to the "entry level" amateur. After all, this is an amateur radio publication, not an electronic engineering publication.

While the emphasis in Amateur Radio magazine is for technical articles, readers also like to read about any other area of amateur radio interest – a visit to a particularly interesting DX location, or perhaps a local event of significant interest to radio amateurs. Most amateurs have at least one good story in them.

The plan

Before you start to write the article, outline what you want to say. Remember the old rule: Tell them what you are going to tell them; tell them; then tell them what you've told them. Or, in more formal language, introduction, body, summary.

Follow this format for construction articles: introduction, theory, construction, alignment and adjustment, and summary. The title and opening paragraph are particularly important, as are diagrams and photographs. You win or lose most readers right at the beginning.

When writing, remember that *Amateur Radio* is an informal, hobby magazine and that you are writing for friends. Don't be a stuffed shirt. Go lightly on impersonal third-person terms, such as "the author". It's in order, however, to occasionally use the first person "I".

Also use direct sentences whenever possible. They deliver your point more forcefully. "I fastened the nut" is better than "the nut was fastened". Write naturally, in short simple sentences, starting a new paragraph with each new thought. Avoid unnecessary abbreviations. Use sub-headings as signposts for the readers.

Misspelling is easily avoided. Most of you have word processors with spell checkers, and hard copy dictionaries are cheap. Look it up!

Minimise maths. It's often not necessary in *Amateur Radio* articles, and it scares many readers. While most readers can use high school algebra and trigonometry, they don't want to. They prefer practical projects, designed and ready to build. Graphs are next best. Maths is last. Even engineers prefer predesigned circuits, if only as a starting point for their work. Use maths only where it is vital. If a mathematical derivation is necessary, show only the steps which introduce fresh logic. Steps of a purely mathematical manipulation nature should not be shown.

Avoid footnotes. References in the text are easier to read.

Make sure you give credit when you borrow an idea or material from someone else. Quote the publication name and issue from which the information was gleaned if it has been previously published. This is important both ethically and legally.

Manuscript

Most authors use computers these days to write their articles and submit their manuscripts as an email attachment. However, you can submit your manuscript by post on a disk or as typewritten hard copy. We prefer not to receive handwritten manuscripts, but will not reject an article because it is handwritten, provided we can read what you have written.

The *Amateur Radio* editors work in IBM format Microsoft Word and do not accept MAC format files. However, we can read other popular word-processing formats as well as Word. If in doubt, submit your electronic copy as an .RTF or .TXT file as well as in your word-processor's native format.

When preparing your electronic manuscript for emailing (or for printing and submitting as hard copy), please observe the following:

- *Do not attempt to format the document to look like a magazine page.*
- Indentations should be made with the TAB key and not the space bar.
- Do not use the ENTER key (line returns) at the end of each line, only at the end of each paragraph.

- Images, illustrations, diagrams, or lengthy lists or tables of figures can be inserted within the manuscript to indicate where they are relevant. However, you MUST also send them as separate files or sheets. Tables and lists are best made using the 'Insert Table' command, or creating them as a separate Excel .XLS file.
- Number all diagrams and photos and include explanatory captions at the foot of the article.
- Ensure your name, call sign, postal address, telephone number and e-mail address are included within the manuscript file.
- When submitting hard copy, use regular A4 typing paper and make sure the printer produces sharp, black text.
- If you must submit a hand written manuscript, perhaps block printing may be best.

Abbreviations and symbols

The editors of *Amateur Radio* magazine use the abbreviations as detailed in the Australian Government Publishing Service (AGPS) Style Manual, such as: Hz, kHz, MHz, GHz, µF, pF, mH, H, W, mW, µW, V, mV, kV, A, mA , µA, dB, km, Ω, kΩ, and MΩ. Do not use full stops or pluralise the abbreviations. Separate them from the number: 10 MHz, not 10MHz. Modes of emission, and acronyms in general, are capitalised: AM, FM, CW, SSB, RTTY, ATV, RF, IF, DC, AC, RMS, VFO, AGC, etc, with the exception of V dc, V ac. Though the text flow should be informal, keep away from 'hammy' abbreviations in your articles such as xtal, XYL, xmtr, xfmr, etc.

Greek letters such as µ and Ω can be created with most word processors. In Microsoft Word, use the 'Insert > Symbol' facility from the menu bar, select Font '(normal text)' and then scroll down until Subset shows you are in the 'Basic Greek' section.

Diagrams, illustrations and schematics

Put all drawings in separate files or on separate sheets of paper. Never put them in the text. If the standard of your drawing is not good enough to be published as is, we will redraw it for you. Be sure your sketches are complete, neat and readable. Put parts values on the schematic and include a separate parts list. Use terms R1 and C2, etc. Label the drawings numerically, for example Fig 1, Fig 2, etc. At the end of your article text, list the figures with a caption for each one.

The *Amateur Radio* draftsman uses TurboCAD for redrawing diagrams. However, if you are proficient in using other CAD programs, such as AutoCAD and Protel, please submit your drawing in your program's default format, as well as a .TIF or .WMF file if possible, and also send a flat (not folded) hard copy printout of the diagram.

Photographs

Good photographs can make all the difference in the appeal of an article. Photographs should be high contrast black and white photographs or colour prints with good contrast and bright colours. We are always in need of interesting photographs for the front cover.

If you send standard 10 x 15 cm size print photos through the post, please ensure they will not get bent. Also, do not write on the back of the photos; use a stick-on label. Label each photo clearly: "Photo 1", "Photo 2", etc. At the end of the article, list the photos along with captions describing each photo.

If you have a colour photograph that you want the editors to consider for the front cover of the magazine, take note of the vertical format requirement for the front cover, and send us a good quality print. Again, a standard 10 x 15 cm size print is satisfactory.

We can also accept digital images if the resolution is sufficient. Generally speaking, this means using at least a 2.0 megapixel (or greater) camera with the image resolution set at maximum. If you want your photo to be considered for the front cover of *Amateur Radio*, it should be taken with at least a 4.0 megapixel setting, although sometimes a 3.0 megapixel setting will suffice.

If you are going to scan a standard 10 x 15 cm size colour print in order to send us a digital file, use a 300 DPI setting. If you are going to scan a standard 10 x 15 cm size greyscale print, use 200 DPI.

If you are going to scan a black and white line drawing, please use 600 DPI.

High resolution .JPG, or standard or LZW compressed .TIF, files are preferred.

PC boards

If your project includes a PC board, send a positive of the board with your article, either hard copy or digital. Separately sketch out the component layout. If the positive is not the same size as the board, be sure to tell us.

Software

It is considered poor practice to reproduce pages of code listing in the magazine. A preferred approach is to publish a description of the logic and function of the program together with an address from which the code file can be obtained.

If your project includes a microprocessor or other device that functions with instructions that you have written, the object code must be made available at no cost to any reader who requests it.

Submission

You can submit your article in several ways. We prefer it electronically as an attachment to an email message. If the attachments total greater than 2 Mb, please send your submission in two or more emails.

If your submission is an article, either technical or general, please email to:

armag@optusnet.com.au

or post hard copy or computer disk to:

Secretary
AR Publications Committee
3 Tamar Court
Mentone VIC 3194.

If your are sending a column or a 'letter to the editor', please email to:

edarmag@chariot.net.au

or post hard copy or computer disk to:

Editor
AR Magazine
34 Hawker Crescent
Elizabeth East SA 5112.

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The editors will arrange publication of your article at the earliest opportunity. Be prepared to wait up to several months, however, before you see your work published. It can take that time to edit and prepare your submission for publication, and place it in a particular issue to ensure a balanced magazine. When possible, articles are published in the order in which they are received.

ar

HF Predictions

by Evan Jarman VK3ANI
34 Alandale Court Blackburn Vic 3130

These graphs show the predicted diurnal variation of key frequencies for the nominated circuits.
These frequencies as identified in the legend are:-

- Upper Decile (F-layer)
- F-layer Maximum Usable Frequency
- E-layer Maximum Usable Frequency
- Optimum Working Frequency (F-layer)
- Absorption Limiting Frequency (D region)

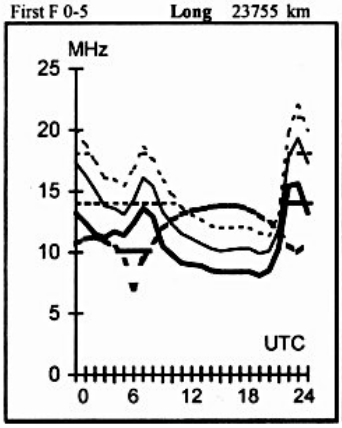
Shown hourly are the highest frequency amateur bands in ranges between these key frequencies, when usable. The path, propagation mode and Australian terminal bearing are also given for each circuit.
These predictions were made with the Ionospheric Prediction Service program: ASAPS Version 4

July 2005
T index: 24

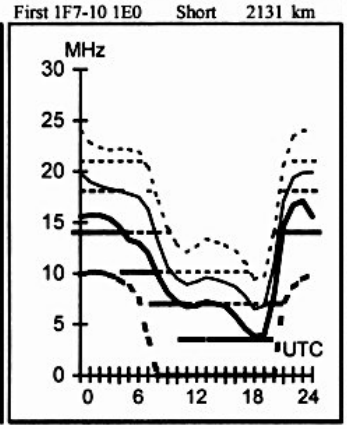
Legend

Frequency scale
UD
E-MUF
OWF
F-MUF
ALF
>10%
>50%
>90%
Time Scale

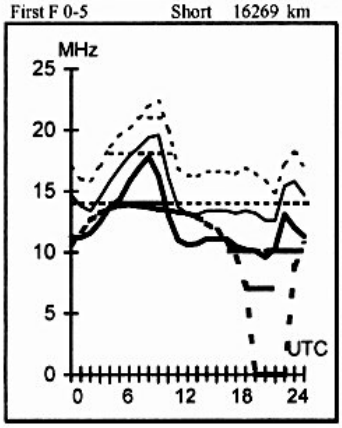
Adelaide-London 132
First F 0-5 Long 23755 km



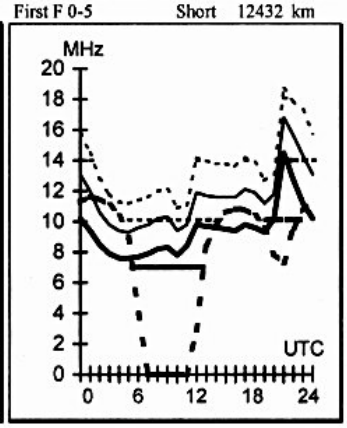
Brisbane-Honiara 21
First 1F7-10 1E0 Short 2131 km



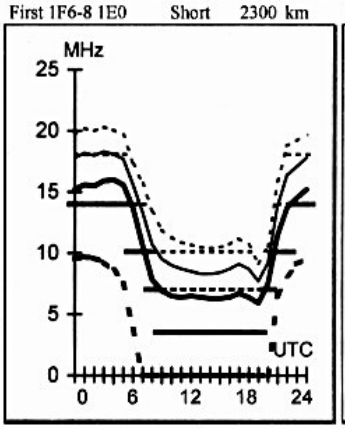
Adelaide-London 312
First F 0-5 Short 16269 km



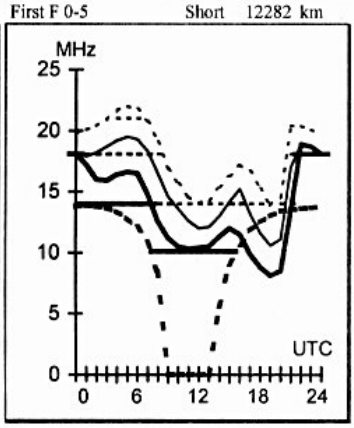
Brisbane-Montevideo 154
First F 0-5 Short 12432 km



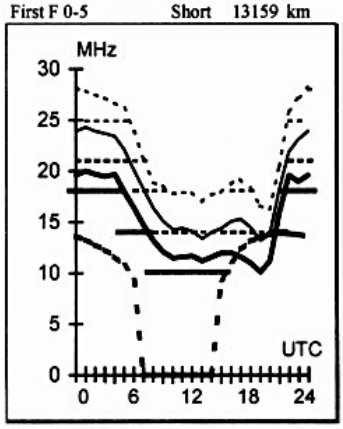
Canberra-Auckland 102
First 1F6-8 1E0 Short 2300 km



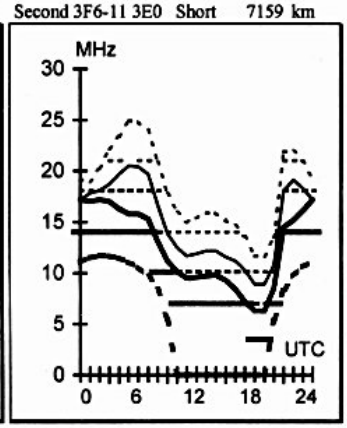
Darwin-Seattle 44
First F 0-5 Short 12282 km



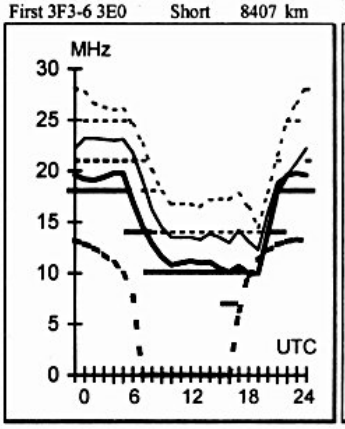
Adelaide-Los Angeles 66
First F 0-5 Short 13159 km



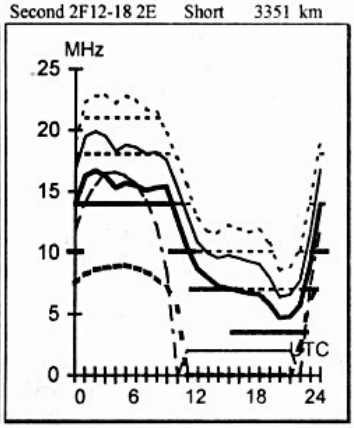
Brisbane-Tokyo 348
Second 3F6-11 3E0 Short 7159 km



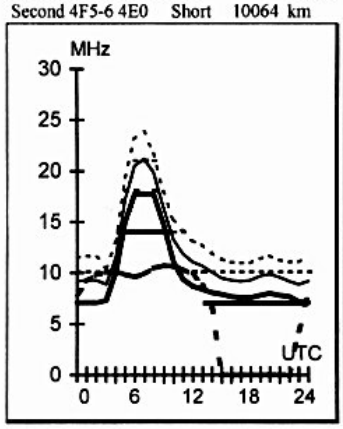
Canberra-Honolulu 50
First 3F3-6 3E0 Short 8407 km



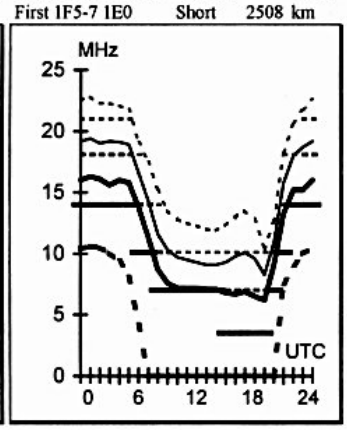
Darwin-Singapore 295
Second 2F12-18 2E Short 3351 km



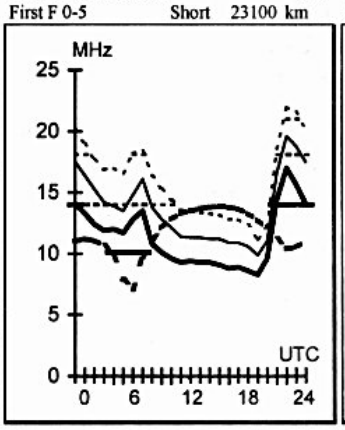
Adelaide-Pretoria 238
Second 4F5-6 4E0 Short 10064 km



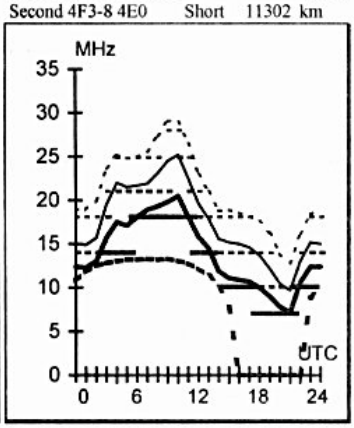
Brisbane-Wellington 133
First 1F5-7 1E0 Short 2508 km



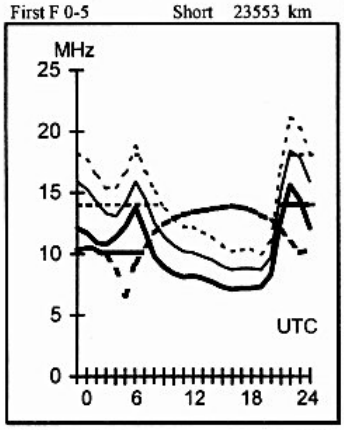
Canberra-Paris 130
First F 0-5 Short 23100 km



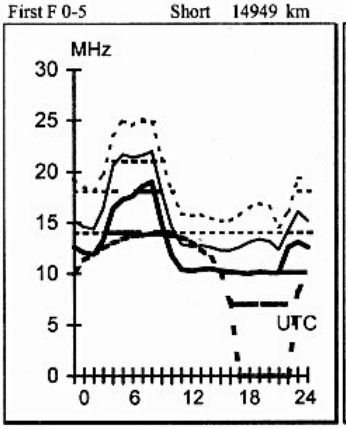
Darwin-Tel Aviv 301
Second 4F3-8 4E0 Short 11302 km



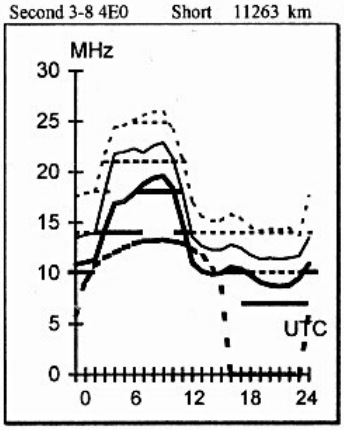
Hobart-Berlin 124
First F 0-5 Short 23553 km



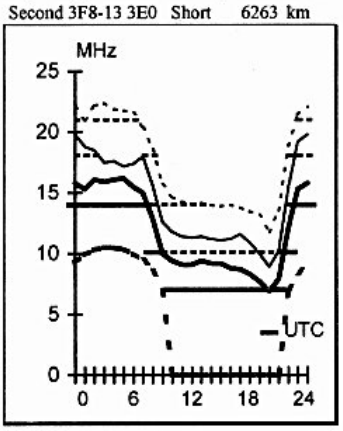
Melbourne-Athens 289
First F 0-5 Short 14949 km



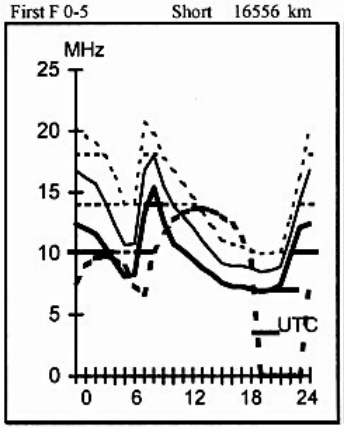
Perth-Cairo 298
Second 3-8 4E0 Short 11263 km



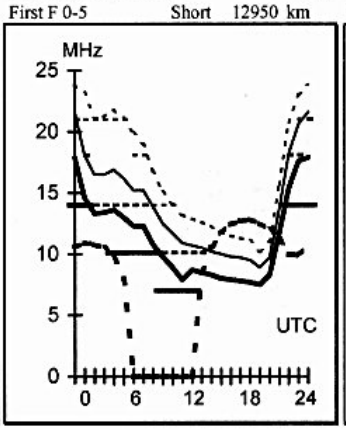
Sydney-Manila 324
Second 3F8-13 3E0 Short 6263 km



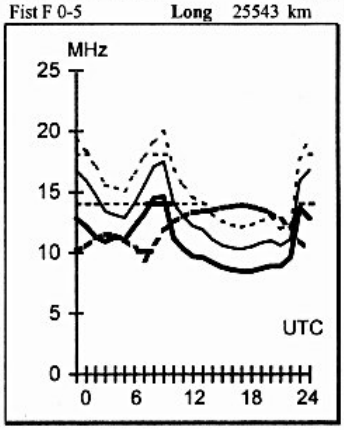
Hobart-Dakar 209
First F 0-5 Short 16556 km



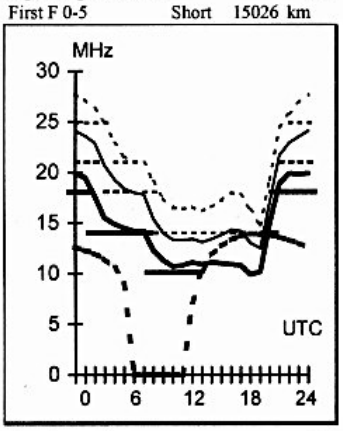
Melbourne-Lima 133
First F 0-5 Short 12950 km



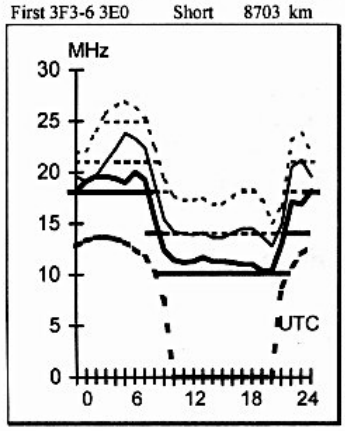
Perth-London 133
Fist F 0-5 **Long** 25543 km



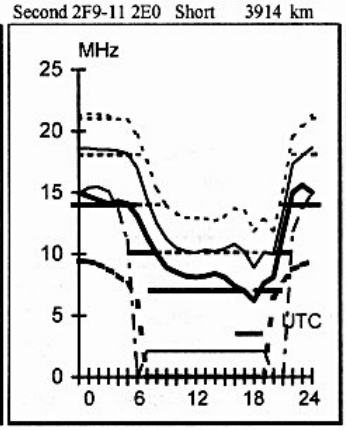
Sydney-Miami 86
First F 0-5 Short 15026 km



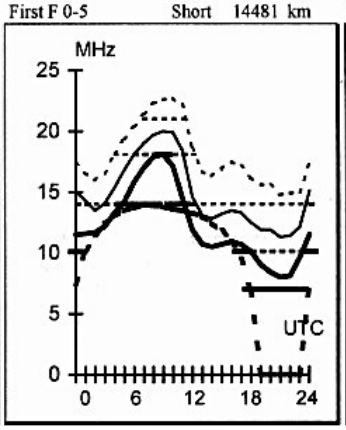
Hobart-Osaka 350
First 3F3-6 3E0 Short 8703 km



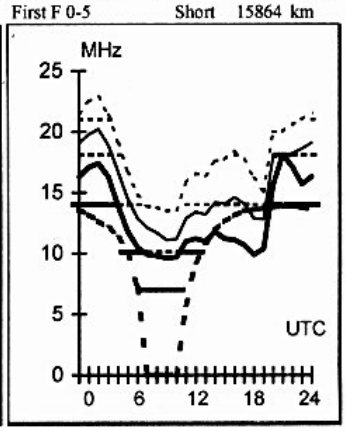
Melbourne-Suva 65
Second 2F9-11 2E0 Short 3914 km



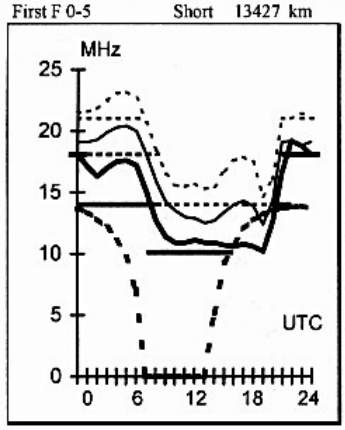
Perth-London 313
First F 0-5 Short 14481 km



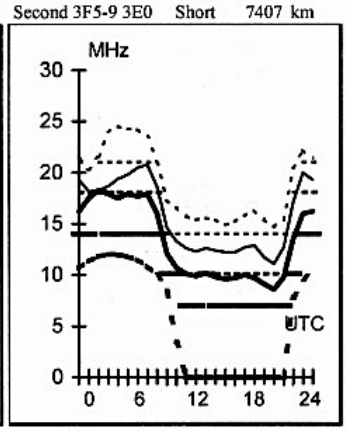
Sydney-Ottawa 58
First F 0-5 Short 15864 km



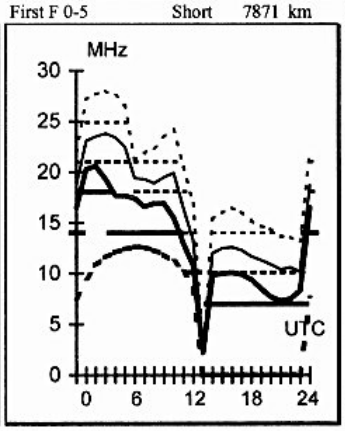
Hobart-Vancouver 49
First F 0-5 Short 13427 km



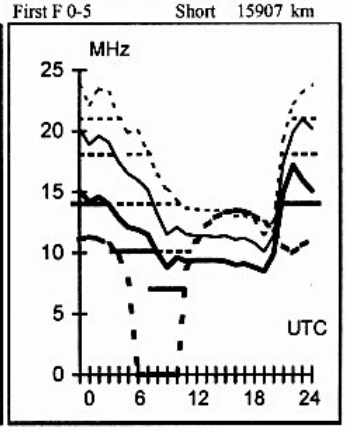
Melbourne-Taipei 337
Second 3F5-9 3E0 Short 7407 km



Perth-New Delhi 325
First F 0-5 Short 7871 km



Sydney-Surinam 133
First F 0-5 Short 15907 km



Hamads *classifieds* FREE

FOR SALE ACT

•***Shack clearance:*** **Wilson 5 element tri band HF beam** on a tilt-over tower with winch & heavy duty rotator. **FT-101EE** in above average condition. **FT-780** 12 watt UHFSSB, CW and FM, **FTDX-401**, PK-232 Packet, Amtor. RTTY keyboard CW etc with Sperry computer. All with manuals. SAE to Col VK1AU QTHR for 5 page list or call Col on 02 6281 3607

FOR SALE NSW

•***Deceased estate VK2FFF:*** **Kenwood TS-940S** s/n 8070307, with operating & service manuals, $400. **Kenwood SWR/Power meter** SW-200 s/n 6020037 with directional coupler & manuals $50. **Jaycar lab oscilloscope KJ-7050** (old) $30. **Mobile mount MMB-20 & relay box FRB-757** (for **Yaesu FT-757**), $30. **Shure desk mic 444D** & manual $50. **AWA oscilloscope 5 in.** type 1A 5650-31 & manual (large - good TX monitor) $50. **MFJ 250 oil-filled dummy load**, $30. **BWD sin/square wave audio generator** model 141, s/n 42498, $50. **Tektronic oscilloscope,** model TAS-220 (2 ch) with manual, offers? **Home brew gear,** all built to professions standards: 2 tone gen. 700 & 1900 Hz, $30. Noise bridge $30. HF linear amplifier 10-80 m (2 X 813s GG) (can make 1 kW), self contained, fully metered, very heavy, beautifully built, with 4 spare tubes, $400, buyer collect. ATU, large, SPC type, with roller inductor, $80. ATU for G5RV large, $50. ATU SPC type, switched inductor, $40. Power supply 1.5–13.8 V variable, regulated, metered, $20. Antennas: trapped vertical, 10-80 m, near new, (brand unknown), $100, buyer collect. Winch-up 2 section guyed aluminium mast approx 12 m high with Chirnside 3 el triband trapped beam CA-33 and Kenpro KR-600 RC rotator, $250 the lot, buyer to dismantle & remove. All subject to near offers. All gear in GWO at last use. Keith VK2AXN QTHR, kandpa@bigpond.com, 02 9489 0304 day only

•**Rotator Kenpro KR-2000RC** VG cond. with control box, new mast clamp, manual; rotator has 2000 kg rotation torque, 10,000 kg braking torque, will support and rotate big sized amateur antenna array, $500. Manfred VK2RV QTHR, phone 02 4938 1560, email mgmeyer@ozemail.com.au

FOR SALE VIC

•**Analog FET multimeter, DSE model Q1143,** $20. **Frequency counter,** 10 Hz to 2.4 GHz, hand-held, battery operation, **Optoelectronics** model M1, $80. **Telecommunication headset** (headphones & mike), **Gamma model LH-085** (new), $20. **Digital LCR meter, model 4070 from Honeytec,** measures inductance, capacitance and resistance, with transistor test function. Like new, $50. Drew Diamond VK3XU, phone 03 9722 1620 QTHR.

WANTED QLD

•**KLM-160** – 2 metre linear amp. circuit and/or handbook required, or information as to how such may be obtained. QTHR or VK4ENG@iprimus.com.au

WANTED SA

Upper and lower drum assembly for a VCR Philips model VR 6940 unused. **Wall poster of CRT Philips 20-AX** (500X series) inline gun self-converging colour picture tube. C S Ratcliff 08 8520 2988

MISCELLANEOUS

•**Old copies AR to give away** - Sept 1998 (3), Oct 1998 (17), Nov 1998 (7), Feb 1999 (2), March 1999 (24), May 1999 (12), July 2001 (1), Aug 2001 (1), Sept 2001 (2), Nov 2001 (2), June 2003 (1), July 2003 (1), all 2004 (12). Might be useful rather than recycle. M M Gell VK5ZLC QTHR

• **The WIA QSL Collection requires QSLs.** All types welcome, especially rare DX pictorial cards, special issue. Please contact the Hon Curator, Ken Matchett VK3TL, 4 Sunrise Hill Road, Montrose Vic 3765, tel. (03) 9728 5350

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- Separate forms for For Sale and Wanted items. Please include name, address STD telephone number and WIA membership number if you do not use the flysheet.
- Deceased estates Hamads will be published in full, even if the ad is not fully radio equipment.
- WIA policy recommends that the serial number of all equipment for sale should be included.
- QTHR means the address is correct in the current WIA Call Book.
- Ordinary Hamads from those who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.
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a radio communications service for the purpose of self training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique with a personal aim and without any pecuniary interest. 1.56 ITU Radio Regulations.

The Wireless Institute of Australia represents the interests of all amateurs throughout Australia.

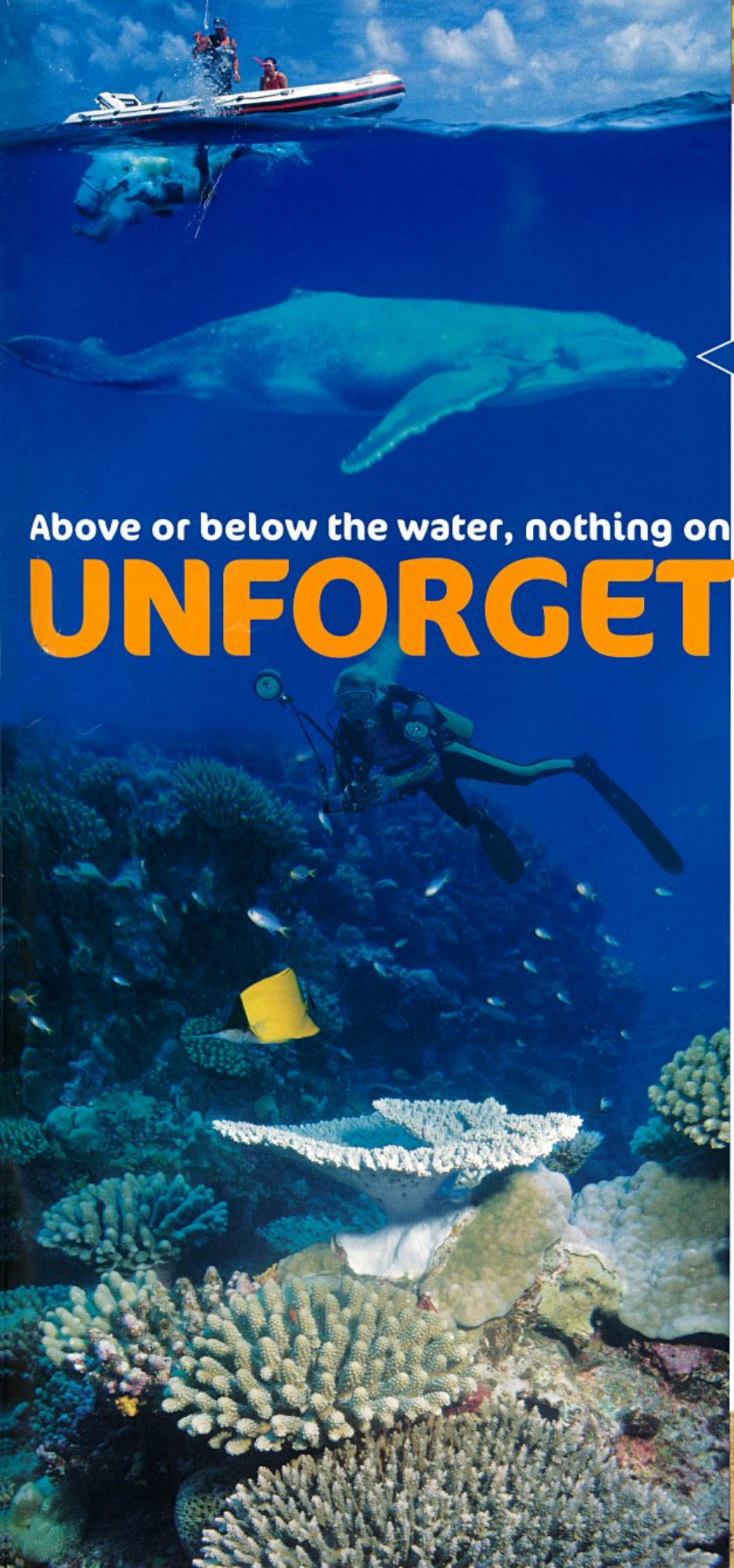
WIA membership fees are: ★ **$ 75 for full members (F grade),** ★ **$ 70 for pensioners and students (G and S grade), and** ★ **$ 50 for membership without 'Amateur Radio' (X grade).** ***Payment direct to National office.***

National Office	Contact	News Bulletin Schedule
10/229 Balaclava Road, Caulfield North VIC 3161, PO Box 2175 Caulfield Junction Vic 3161 Australia	Phone 03 9528 5962, Fax 03 9523 8191, 10am to 4pm daily, nationaloffice@wia.org.au http://www.wia.org.au	Subject to change see www.wia.org.au follow national news prompts. Contact nationalnews@wia.org.au National VK1WIA news is distributed to all states.

Advisory Committees	Contact	News Bulletin Schedule
VK1 Australian Capital Territory VK1WX Alan Hawes VK1ZPL Phil Longworth VK1ET John Woolner VK1GH Gil Hughes	secretary@vk1.wia.ampr.org	Sundays at 11.00 am VK1WIA 7.128, 146.950,438.050 Canberra Region Amateur Radio Club Email newsletter will be sent on request to president@vk1.ampr.org
VK2 New South Wales VK2QV Chris Flak VK2XCD Chris Devery VK2BFN Adrian Clout	Phone 02 9689 2417	VK2WI - Sunday 1000 and 1930 hours local.1.845; 3.595; 7.146; 10.125; 14.170; 28.320, 52.525; 145.600; 147.000; 438.525; 1273.500 megahertz. Plus regional relays. VK1WIA news included in the morning
VK3 Victoria VK3JJB John Brown VK3PC Jim Linton VK3APO Peter Mill	Phone 03 9885 9261 advisory@wiavic.org.au	VK1WIA Sunday 11.0am via HF and major VHF / UHF rptrs
VK4 Queensland VK4ERM Ewan McLeod VK4ZZ Gavin Reibelt	Phone 07 3221 9377 ewan.mcleod@bigpond.com	VK1WIA, Sunday 9.0am via HF and major VHF/UHF rptrs
VK5 South Australia and Northern Territory VK5NB Jim McLachlan VK5APR Peter Reichelt VK5ATQ Trevor Quick	Phone 08 8294 2992 jimac@picknowl.com.au peter.reichelt@bigpond.com vk5atq@chariot.net.au	VK5WI: 1843 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.800 FM Mildura, 146.900 FM South East, 146.925 FM Central North, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide. (NT) 3.555 LSB, 7.065 LSB, 10.125 USB, 146.700 FM, 0900 hrs Sunday. The repeat of the broadcast occurs Monday Nights at 1930hrs on 3585kHz and 146.675 MHz FM. The broadcast is available in 'Realaudio' format from the website at www.sant.wia.org.au Broadcast Page area.
VK6 Western Australia VK6NE Neil Penfold VK6XV Roy Watkins VK6OO Bruce Hedland-Thomas	Phone 08 9351 8873 http://www.vk6.net/ advisory@vk6.net vk6ne@upnaway.com vk6xv@bigpond.net.au	VK6WIA: 146.700 FM(R) Perth at 0930hrs Sunday relayed on 1.865, 3.564, 7.075, 10.125, 14.116, 14.175, 21.185, 29.120 FM, 50.150 and 438.525 MHz, Country relays 3.582, 147.200 (R) Cataby, 147.350 (R) Busselton, 146.900 (R) Mt William (Bunbury).147.000 (R) Katanning and 147.250 (R) Mt Saddleback. Broadcast repeated on 146.700 at 1900 hrs Sunday relayed on 1.865, 3.564 and 438.525 MHz : country relays on 146.900,147.000, 147.200, 147.250 and 147.350 MHz..Also in "Real Audio" format from the VK6 WIA website
VK7 Tasmania VK7ZAX Phil Corby VK7DG Dale Barnes VK7KK Reg Emmett	Phone 03 6234 3553 phil.corby@tassie.net.au vk7dg@wia.org.au regemm@ozemail.com.au	VK1WIA Sunday 9am on VK7WI network: 3.570MHz LSB, 146.700 MHz FM (VK7RHT South), 53.825MHZ FM (VK7RAD South), 147.000MHz FM (VK7RAA North), 146.750 FM & 53.825MHz (VK7RNW North West), 146.625 MHz FM (VK7RMD North West), UHF CB Channel 15 (Hobart) and 27MHz CB - 27.225MHz LSB (Hobart). Followed at 9:30am with VK7 Regional News Broadcast also on 7.090MHz LSB & 14.130MHz USB

Notes

1. Only three members of the state advisory committees are listed.
2. All listings are preliminary. They will be updated each month as required.
3. Membership application forms are available from the WIA web site www.wia.org.au or the national office address above.



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